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IRRIGATION OF LOMBARDY.

From Arthur Young's Notes on the Agriculture of Lombardy.

(Concluded from page 188.)

The same law that has been so effectual in watering Piedmont, operates here also, and has done even greater things. He who discovers a spring, conducts it where he pleases, paying a fixed compensation* for cutting through the properties of others. All rivers belong, as in Piedmont, to the sovereign, who sells the waters to speculators for this most beneficial purpose of irrigation. In the distribution of it, by sale, they do not measure by the hour, as in Piedmont, but by the ounce; 12 oz. are a braccio, or 22 inches: an ounce of water is a stream that runs one braccio long and one ounce deep; and the farther the water has run, the higher is the price, as being more charged with manure.

As an example of the beneficial influence of this law, I was shown, between Milan and Pavia, a spring that was discovered two miles from the lands of the discoverer, the properties of many persons lying between him and the spring. He first bought the property of the person in whose land it was situated, which was easily done, as it was too low to be there of any use; then he conducted it by a trench at pleasure the two miles, paying the fixed price for cutting through his neighbors' lands; and, having gained it upon his own, presently changed poor hungry arable gravel into a very fine watered meadow.

Near Milan, a watered meadow sells at 800 *liv.* the pertica, (£32. 15*s.* the English acre;) and the rent of such is about 30 *liv.* (£1. 5*s.* the English acre.) This must not, however, be classed high; for there are lands that rise to 4000 *liv.* (£163 the English acre.) In land at 800 *liv.* or 1000 *liv.* water often makes half of the value; that is, the rent to the owner of the land will be 15 *liv.* to 20 *liv.;* and as much to some other person for the water.

In viewing a great farm, six or seven miles from Milan, in the road to Pavia, I found that all the watered meadow was mown four times; and that what was watered in winter, *prati di mercita*, five times. Such is the value of water here, that this farm, which, watered, is rented at 20 *liv.* the pertica, would not let at more than 6 *liv.* without water, the soil being gravel. The irrigation of the *mercita* begins in October, and lasts till March, when it is regulated like all other meadows. All in general begin in April, and last till September; and if there be no rain, once in seven to fifteen days. An ounce of water, running continually from the 24th of March to the 8th of September, is worth, and will sell for 1000 *liv.* When arable crops want water, it is always given.

Milan to Mozzata.—Every considerable spring that is found, becomes the origin of a new canal. They clear out the head for a basin, and sink casks, by way of tunnels, for the water to rise freely, and without impediment from mud or weeds. There are usually three, four, or five of these tunnels, at the bottom of a basin of twenty or thirty yards.

Milan to Lodi.—Of all the exertions that I have any where seen in irrigation, they are here by far the greatest. The canals are not only more numerous, more incessant, and without interruption, but are conducted with the most attention, skill, and expense. There is, for most of the way, one canal on each side of the road, and sometimes two. Cross ones are thrown over these, on arches, and pass in trunks of brick or stone under the road. A very considerable one, after passing for several miles by the side of the highway, sinks under it, and also under two other canals, carried in stone troughs eight feet wide; and at the same place under a smaller, that is conducted in wood. The variety of directions in which the water is carried, the ease with which it flows in contrary directions, the obstacles which are overcome, are objects of admiration. The expense thus employed, in the twenty miles from Milan to Lodi, is immense. There is but little rice, and some arable, which does not seem under the best management; but the grass and clover rich and luxuriant: and there are some great herds of cows, to which all this country ought to be applied. I cannot but esteem the twenty miles as affording one of the most curious and valuable prospects in the power of a farmer to view; we have some undertakings in England that are meritorious; but they sink to nothing in comparison with these great and truly noble works. It is one of the rides which I wish those to take, who think that every thing is to be seen in England.

Lodi.—Examining some watered meadows in high estimation, I found the following plants most predominant, and in the order in which I note them:—1, *Ranunculus repens;* 2, *Trifolium pratense;* 3, *Chicorium intybus;* 4, *Plantago lanceolata;* 5, *Achillea millefolium;** and about one fifth of the whole herbage at bottom seems what are properly called grasses. These rich meadows about Lodi are all intersected by ditches, without hedges, but a double row of pollard poplars; all on a dead level, and no drains to be seen. They are now (October,) cutting the grass and weeds in the ditches, to cart home for making dung. The meadows are commonly cut thrice; but the best four

*These laws, relative to the conduct of irrigation, are as old as the republic of Milan; first compiled into a collection of statutes and customs in 1216, (Verri, p. 239.) They were revised and collected, by order of Charles V, and are in full force to this day. Constitutiones Dominii Mediolanensis Decretis et Senatus Consultis. Gab. Verri. Folio, 1747. De aquis et fluminibus, p. 168.

*There appeared but few signs of ray-grass, yet it certainly abounds in some of their fields: opinions in Lombardy differ concerning it; Sig. Scannagatta praises it highly, (Atti di Milano, tom. ii p. 114;) but one of the best writers in their language, Sig. Lavezari, (tom. i. p. 82.) wonders rather at the commendations given of it in other countries: he mistakes the French name, it is not sainfoin; the *lojessa* of Lombardy, and the ray-grass of England, is the *lolium perenne;* the French sainfoin is the *hedysarum onobrachis*.

times. The produce of hay per pertica, 6 *fassi*, of 100 lb. of 28 oz. at the three cuts. Price of the first, 8 *liv.* per fass; of the second, 5 *liv.*; of the third, 4½ *liv.* They water immediately after clearing, if there be no rain. Without irrigation, the rent of the country in general would be only one-third of what it is at present. In forming these watered meadows, they have very singular customs—all are broken up in rotation; flax sown for the first crop, and their way of laying down is to leave a wheat stubble to clothe itself; clover is prohibited by lease, from an absurd notion that it exhausts the land; and that it is not so good as what the nature of the ground gives; but on worse land, the other side of the Adda, they sow clover.

Lodi to Codogno.—All this country the same as about Lodi; a dead level, cut into bits of from three to ten acres, by ditches, without hedges, and planted with double rows of poplars and willows, all young, for they are cut as soon as the size is that of a thin man: here and there one is left to run up to timber. I remarked, in the meadows fed, that the *ranunculus* is avoided by the cows as much as possible. I expected, in one meadow, to find it the *acris*, but much of it was the *repens*. All this country is alternately in tillage; ridge and furrow every where: no permanent meadow. After seven miles, the road being natural, shows the soil to be a loamy sand, binding with rains.*

Codogno.—Thirteen pertiche of watered land necessary for a cow; the hay of which is cut thrice and it is fed once; such land sells at 300 *liv.* free from tax. The whole country is ploughed by turns, being down to clover for the cows four years. 1. Flax, and then millet; 2, maize; 3, wheat and clover; and rests then for feeding cows; white clover comes, but it is bad for cheese. The reader will note, that this opinion differs from that near Milan.

Codogno to Crema.—Crossing the Adda, from the Lodizan, there is more arable, and much fewer cows.

Milan to Vaprio.—In this line there are some dairies, but not many. Near the city there is much grass, all cut into patch-work of divisions, and planted so as to seem a wood of willows; after that much tillage: though all is flat, and there are no great exertions in watering. But the road passes by that fine navigable canal de Martesano from Milan, which, at Vaprio is suspended as it were against the hill, twenty feet above the Adda: a noble spectacle.

Before we quit the Milanese, it will be proper to make a general remark on the conduct of their irrigation, that some evils are observed to attend the practice, for want of a better foresight and more attention; particularly from the gradual enlargement of the carrier canals and ditches; they clean them with so much care, for the sake of obtaining the mud, as a manure, that these are every where become too wide for the quantity of water they convey. Sig. Bignami has written upon this point very rationally, in his dissertation *Sull' abuso di scavare i canali delle roggie ed i fossi nel Lodigiano;* where he asserts, that one-tenth part of their lands is occupied by canals and ditches. The evils are numerous; it is not only a considerable loss of land, but it is an equal loss of water, for when an oncia of a given run of water is purchased, there is a great difference between its first filling a great or a small channel, as in proportion to the size will be the quantity of useless fluid. The atmosphere is also proportionably contaminated; for this great breadth, either of stagnant water, when irrigation is not actually going on, or, what is worse, of mud, in so hot a climate, must be pestiferous; and to this have been attributed the distempers which have frequently made such havoc among their cattle. Another inconvenience is the greater expense of all erections, bridges, sluices, &c. which are in proportion to the breadth of the channels. The remedy is obvious; it is to forbear all cleansing for the sake of mud; to let all aquatic weeds, and other plants, grow freely *on the banks, edges, and sides* of the canals, and to clear them in the middle only. Such a conduct would, in time, quite choak them up, and enable the farmer to keep his canals exactly to their right width. All these plants covering the spaces which, in canals often cleaned, are bare earth or mud, would be very beneficial towards preventing and decomposing that noxious, and mephitic, and inflammable gas, always issuing from such mud, which is so pestilential to animals, yet so salutiferous to plants; for mud, covered with plants that are ready to feed on its exhalations, is much less mischievous than that which is exposed to the rays of a burning sun. Count Carlo Bettoni, of Brescia, has practised a method which acts on similar principles; namely, that of burying or fixing willows or poplars to the sides of the rivers whose banks he wanted to preserve, with the precaution only of keeping the ends of the branches out of water; he finds that they grow vigorously in this situation, and, by stopping the mud of the current, form a solid bank; this, on a small scale, might certainly be executed: also in the canals of irrigation, as it has been remarked, by the author already quoted, in the *Atti di Milano.*

VENETIAN STATE.—*Vaprio to Bergamo.*—There is a mixture of watered meadow in this line, but the quantity is not considerable. In some which are old, I found a good sprinkling of *trifolium repens, chicorium intybus*, and *plantago lanceolata;* but also much *ranunculus* and rubbish. In the plain close to Bergamo, they clean the irrigation-ditches at the end of November, and harrowing them with a faggot, to thicken the water, let it immediately on to their meadows, which is said to enrich them much.

To Brescia.—The Venetian state, thus far, is a considerable falling off from the Milanese, in respect to irrigation; the country is not without canals, but neither the number, nor the importance

* As well watered as this country is, yet in the spring 1779 the season was so dry, that, where the Lambro enters the Po, men and women crossed the Po itself on foot, as if merely a rivulet; the rector of Alberoni himself passed it, and the water reached only to his middle. The damage was great every where, but fatal in the Lodizan, where herds of cows were obliged to be sent out of the country to be pastured: the mischief the greater, as from 1774 to 1779 they had augmented their cows 5000, (Opuscoli Scelti, tom, vi, p. 56.) The climate has, however, in all ages, been subject to great droughts. From May 1158 to May 1159. there fell no rain in Lombardy; wells and springs all dried up. The Emperor passed the Adige, with his army, near Verona, without boats; and the Count Palatine of Bavaria passed thus the Po, below Ferrara. Giulina, tom. vi. p. 175.

of them is to be compared to those of Milan. From Coquillo to Brescia, there are many channels, yet the lands are not half watered.

Brescia to Verona.—The road passes, for some distance, by a very fine canal, yet the quantity of watered land in this route is but inconsiderable. Before we arrive at the Lago di Guarda, there are a few meadows never ploughed, that have a good appearance: but none from the lake to Verona. On the whole, these forty miles, for want of more irrigation, are not comparable to the Milanese or to Piedmont. This route, so much to the north, gives the traveller an opportunity of seeing a chain of considerable cities, and of observing the effects of one of the most celebrated governments that has existed; but a better direction for me, would have been by Cremona and Mantua.

Verona.—The meadows here are cut thrice, and fed once; are never ploughed, if good and well watered. Water for irrigation here, as in all Lombardy, is measured with great care and attention, by what is called the quadrata, which is a square foot, (the Veronese foot is to the English about as twenty are to twelve.) Twelve quadrate are sufficient to water five hundred campi of rice-grounds, (about three hundred and eighty English acres,) and the price of such a quantity of water, is commonly about three thousand *zecchini* (1425*l* sterling.) The wheels in this city, for raising water for irrigating the gardens, are very complete; they receive the water, as in Spain, into hollow fellies. There is one in the garden of the Daniele monastery, for watering about four campi, which are said to yield a revenue of three hundred zecchini; which is one hundred zecchini, of 9s. 6d. per English acre. The wheel raises the water about twenty-five feet, receiving its motion by the stream; a low wall crossing the garden, conveys the water in a trench of masonry on its tops; and a walk passing along the centre of the garden, the wall there is open to admit the path; the water sinking in a syphon, and rising on the other side, to the same height, passes again along the wall, in the same manner as canals are carried under roads in Piedmont, &c. The wheel has double fellies, for giving water on both sides into troughs, which unite in the same receiver, and the washers for giving the motion are placed between the fellies. The whole apparatus, complete, cost three hundred zecchini.

To Vicenza.—There are in this tract of country, some perennial meadows watered, quite upon a level, which have a very good aspect; the existence of such should make us question the propriety of the Lodizan system of ploughing, where water is so regularly at command.

Padua.—The country, from Vicenza to this city, is not watered, like many other districts of Lombardy. The practice is very well known; and there are rice-grounds about Padua, but not nearly the use made of water which is found in the Milanese; yet the rivers in the Venetian state belong to the prince, as well as in other parts of Italy, and water is consequently to be bought: but there is not the same right to conduct it at will, and consequently the water itself might almost as well not exist.

To Venice.—In this tract I saw no irrigation, though the whole is very low, and quite level.

Venice.—The same admirable law, that takes place in the Milanese, for enabling every man to conduct water where he pleases, is found in the Venetian state also, contrary to my information at Padua; but so many forms are necessary, and the person who attempts it must fight his way through so much expensive litigation, that it is a dead letter, and nothing done in consequence. I was farther told, that it is a principle of the Venetian code, that not only all rivers, but even springs, and rain itself, belongs to the prince: an idea worthy of this stern and tyrannical government.

ECCLESIASTICAL STATE.—*Bologna.*—I saw no watered lands.

TUSCANY.—I saw no irrigation in Tuscany; and, from the intelligence I received, have reason to believe, that the quantity is not considerable; some meadows, however, are watered after mowing. The best meadows I heard of, are about Poggio, Caiana, Villa Sovrana, ten miles from Florence.

DUTCHY OF MODENA.—The quantity of irrigated land in the Modenese, is but small; it does not amount to more than six biolche in eighty, nor have they more than fifteen perpetual water-mills in the whole territory. From Modena to Reggio, there is a sprinkling of these meadows, the canals for which, taken from the Lecchia, are not large; all, whether watered or not, are manuring, with black well rotted compost, and have a very neat countenance.

DUTCHY OF PARMA.—The country from Reggio to Parma, is not without watering, but the quantity is inconsiderable; there is, in this line of country, a great inferiority to that from Modena to Reggio; not the same neatness nor attention, in any respect; there are mole-casts in the meadows, a thing unseen before; and though there are much cattle and sheep, yet the features of the husbandry are worse. From Parma to Firenzuola, not an hundredth part of the country irrigated, yet there is a good deal of grass, and in some places in large pieces.

PIEDMONT.—*Pavese, &c.*—For some miles in the Sardinian territories, there are a good many meadows, but very few watered. I passed two small channels of irrigation, but the quantity was inconsiderable. If a map of these countries be examined, there is the appearance of many rivers descending from the Appenines, and falling into the Po, but the use made of them is small. It is remarkable, that all the way by Tortona, Alexandria, &c. to Turin, the quantity of irrigation, till almost close to the last mentioned city, is quite inconsiderable, not one acre, perhaps, in a thousand. What an idea can be framed of Piedmont, by those who pass through it from Mont Cenis, and quit it for Milan or Tortona, without seeing it from Turin to Coni?

SAVOY.—In the mountains of the Alps, by Lanesburg, &c. they mow their watered meadows once only, but in the plain twice.

From this detail of the irrigation of Lombardy, it must be apparent, that, for want of laws similar to those which take place fully in Piedmont, and the Milanese, and partially in the republic of Venice, no such exertions are ever likely to be made in a free country. We can in England form no navigation, or road, or make any trespass or private property, without the horribly expensive form

of an act of parliament; we cannot even inclose our own property, without the same ceremony. Nor is it only the expense of such applications, but the necessity of them generates opposition at every step, and a man must fight his way through county-meetings, through attorneys, agents, council, witnesses, and litigation,—in a manner odious to every liberal feeling, and at a ruinous expense, before he is at liberty to improve his own estate, without any detriment to others; every idea of such works, therefore, in England, as we have seen common in Lombardy, is visionary and impracticable; and we must continue to view, with eyes of envy and admiration, the noble exertions which have been made and perfected in that country, and which, in truth, very much exceed any thing we have to exhibit in any walk of agriculture in this island:—an example to hold up for imitation, and an ample field of practical study.

OMISSION.

The following extracts from Arthur Young's '*Notes on the Agriculture of Lombardy*,' had been marked to be included or cited in the "*Essay on Silk Culture*,' in the preceding number, (p. 140.) They show the great extremes of heat of summer and cold of winter in this, the most productive silk country of Europe; and they furnish strong testimony in addition to that which was presented, that the similar extremes, which belong to the climate of Virginia, instead of being opposed to silk-culture, constitute the strongest assurance of its success and profitable returns.

"The great complaint in Piedmont, is the excessive heat in summer; equal, I was assured, to almost any that is felt on the globe, and of a suffocating quality; while the frosts in winter are as severe, in the contrary extreme. The pestiferous climate of Sardinia is known to every body; though between 39 and 41 degrees latitude; in the southern part of the island, they are not forwarder than in the Milanese: they cut their corn in the north part in July: in the Milanese before the end of June."

"The most remarkable circumstance in the climate of Milanese, is the mildness and warmth of northern and mountainous tracts, and the severity felt in the plain. This fact is found particularly around the lake of Como; upon all the western coast of that lake, which is about forty miles long, the *agrumi*, as the Italians call oranges, lemons, &c. are found, exposed to the open air, in good perfection; yet the whole of the lake is bounded by the high Alps, which, immediatly to the north, are covered with eternal snows. On the rich plain of Milan, and thence to the Appenines, no such plant can be left exposed; olives are not seen, and oranges, lemons, and bergamots, must be covered in winter."

"In an experiment made at Vicenza, in the Venetian state, by the Accademia Agraria of this city, they sowed wheat October 18, 1787; came up the 28th; the ears appeared May 2, 1788; the flowers May 13; reaped June 19."

"I was at Florence the beginning of November, and the ice was four inches thick; a severity never yet known in England. The English were, at the same time, skating at Rome."

"One-fifth of all the productions of the earth are calculated to be destroyed by hail and other accidents."

"In the management of the vines in the Parmazan, there is a practice, which shews the constant dread of severe frosts. All the vines are now (in November,) turned down, and the end shoots buried* in the earth to preserve them; yet in a wet season they suffer by this treatment, as well as in all seasons, by being stript from the trees, in order to undergo this operation."

"Mr. Professor Symonds, in the excellent paper quoted above, removed the common erroneous idea of the fine climate of Italy. I made many inquiries concerning the leading facts, and have every reason to believe that it is, in point of health and agreeableness, one of the worst climates in the world: with the views of a farmer, however, it must be confessed, that the productions which the whole peninsula owes to its climate are very valuable. To omit speaking of Sicily or Naples, I may remark, that planting the poor brashy hills of Tuscany with olives is an advantage unequalled by any thing to be met with in the north of Europe; that the produce of silk throughout Lombardy is an object of the first importance—that rice is found to be an article of almost unrivalled profit: that the productive state of the meadows is indebted almost as much to the heat of the summers, as to the plenty of water; and, for any thing I know to the contrary, the admirable quality of the cheese also. These are all objects of great magnitude, and entirely derived from climate."

From the Penny Magazine.

IMPORTANCE OF THE CULTIVATION OF THE VINE IN FRANCE.

Whenever the commercial intercourse between France and England shall be regulated by better principles of economy than those under which it is at present conducted, wine will be the great staple with which the French will make their exchanges for English products. A few statements exhibiting the extent of production in this article in France will not therefore be devoid of interest. In presenting the following facts, it is necessary to state that we have borrowed largely from Dr. Bowring's 'Report on the Commercial Intercourse between France and Great Britain:'—

According to the estimates of M. Cavoleau, who obtained a prize given by the institute for an elaborate work on the vineyards and vines of France, the quantity of vineyard-land in 1806 was about 4,142,600 English acres, and in 1827 about 4,265,000 acres. The calculations of the French Statistical Society show that in 1788 the number of acres in cultivation was 3,988,800 acres, and in 1829 about 5,104,000 acres. The vine-growers estimate the increase of vineyards since 1788 at 28 per cent.

France is divided, for fiscal purposes, into 76 wine-districts, in the same way that England is sub-divided by the board of excise into districts termed "collections." The total superfices of

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* The same practice was known among the ancients. See *Strabo*, lib. vii. and *Quint. Curt.* lib. vii. c. 3.

France is not quite 53,000,000 hectares, the uncultivated lands amounting to nearly one-eighth of the whole. More than one-thirtieth part of France, including the waste lands, is cultivated in vineyards: this is equivalent to about a seventh part of England. If the counties of Bedford, Buckingham, Berks, Hertford, Huntingdon, Middlesex, Oxford, Rutland, Surrey, Westmoreland, and Worcester, were entirely covered with vineyards, the vineyards of France would exceed them in extent by 375 square miles. The distance from London to York is 196 miles; and if the land on each side of the road produced vines, instead of grain and food for cattle, each side of the road to the extent of above sixteen miles must be appropriated to this purpose in order to equal the breadth of land in France which is devoted to the vine; or, in other words, a tract of country nearly 200 miles long and 33 broad.

M. Cavoleau estimated the *value* of the annual produce of the vineyards at 21,615,572*l.*; the Statistical Society at 28,040,000*l*, and in 1788 at only 14,260,000*l.*

M. Cavoleau is of opinion that the *quantity* of wine produced in a year is 812,808,040 gallons, or about 200 gallons an acre. The estimate of the Statistical Society is 998,932,900 gallons, worth on an average 6¾*d.* per gallon; and the production of 1788 is estimated at about 610,750,000 gallons.

The wine-growers are supposed to be 1,800,000 in number.

A commission which was instituted a few years ago to examine into the operation of the tax on wine, which amounts to about 2,900,000*l.* per annum, assumed the total produce to be 924,020,000 gallons, and calculated by approximation the manner in which it was disposed of. They estimated that there was—

	Gallons.
Consumed by the proprietors, not being subject to the duty - -	198,000,000
Employed in the manufacture of brandy - - - - - -	141,680,000
Loss and waste among the growers	91,344,000
Loss in conveyance, and in the hands of dealers - - -	44,000,000
Exported - - - - - -	24,530,000
For the manufacture of vinegar -	11,000,000
Duty recovered on consumption is	308,000,000
And the fraudulent consumption is	105,466,000

The loss by evaporation was calculated at 12 per cent. per annum on the small, and 5 per cent. on the large casks.

The total average export of wine is about 22,000,000 gallons, of an average value of nearly 2,000,000*l.*

The district in which the production of wine is carried on to the largest extent, and where the cultivation of the vine is the most advanced, and the qualities of the wine of the highest order, is the department of the Gironde. The superficies of the Gironde is 2,500,000 acres, and the extent of vineyards is equal to 350,000 English acres. The average produce is between 50,000,000 and 60,000,000 gallons, five-eighths of which are red, and three-eighths white wine, the whole, or nearly so, being suited to foreign demand. In very favorable years the production will amount to 75,000,000 gallons.

The value of vineyard property varies very much. The Monton estate, consisting of 135 acres, was sold in 1830 at the rate of 356*l.* per acre: this is the highest price ever paid. The estate of Lafitte, consisting of 262 acres, was sold in 1803 at the rate of 183*l.* 4*s.* per acre. Both these estates are situate in the Medoc district. About 5154 acres of Medoc wine estates have been sold in the present century; the average amount obtained was 64*l.* per acre. The demand from England for the fine Medoc wines has raised the value of the land which produces them.

The difference in the value of wine of the same vineyard varies exceedingly from one year to another, according to the season being favorable or unfavorable. The produce of Lafitte, Latour, and Chateau Margaux, which are the most esteemed vineyards, has been as low as 4*l.* a hogshead in a bad year. On the other hand, it has, under different circumstances, been as high as 30*l.*

The condition of the population employed in vineyards is an interesting subject of inquiry. A communication addressed to Dr. Bowring by the members of the chamber of commerce at Rheims affords some information on this point, which we subjoin:—In the arrondissement of Rheims the number of vine-proprietors is 11,903. This large number of owners is owing to the division of property; divisions so much the more multiplied, as there is not a single vine-dresser working at piecework who does not rent some plot of vineyard, and thus the number of separate holders of vineyards is from 22,000 to 23,000. The small laboring proprietors are generally burdened with families, and not well off. They form in society an interesting and very laborious class, making the best appearance they can by severe economy. As soon as there is a promise of a good harvest, they purchase some vineyard-ground, often without prudence, and beyond their means. Afterwards, if bad years come on, they borrow to free themselves. If, in order that they may not mortgage their little property, they have recourse to usurers, they sign and renew bills on very disadvantageous terms. If they borrow on mortgage, the rate of interest is nominally 5 per cent. to the profit of the lender, but in reality from 6 to 7 per cent. at the cost of the borrower, on account of the expenses of the transaction.

In the district where the Macon and Beaujolais wines are produced, the receiver-general of the department of the Rhone gave Dr. Bowring the following account of the condition of the population whose interests are connected with the vineyards:—"Each hectare of vines (nearly 2½ acres) represents a capital of from 5000 to 6000 francs (200*l.* to 240*l.*) on an average. The expense of cultivation may be estimated, every thing included, at about 200 francs (8*l.*) the hectare. The labor of each vigneron (vine-dresser) comprises nearly two hectares, and occupies a whole family. The cultivation of the vine is carried on by an equal division of the produce between the proprietors and the cultivators; the latter are, indeed, a species of participating colonists termed vignerons. This method, by establishing a community of interest between the proprietor and the laborer, tends to render their relations intimate and paternal. It attaches the cultivator to the ground, equally with the proprietor himself, and in some respects removes him from the class of dependent workmen. This class, in general, is not unprosperous: all those who have habits of labor and

economy live at their ease. They begin to live rather better than they formerly did; their wants are attributed to the dearness of articles of consumption, of which they are deprived, such as meat, which they very rarely eat, and iron, of which they use large quantities for their farming. They sometimes suffer from the want of sale for their productions."

M. Joannot, the intelligent librarian of the Bordeaux public library, has afforded ample information respecting the moral and social condition of the population engaged in vineyards in the department of the Gironde. He states that the proprietors of vineyards producing wines of the first quality are rich, but the others are not in prosperous circumstances, and if they were not also engaged in farming it would be impossible to support themselves. M. Joannot says that, owing to the ambition of the small land-owners to increase their possessions, they often purchase land at a price very much above its real value. The average daily pay of a vine-dresser is 1*s.* 4*d.*; a woman and child together gain about 7½*d.*; and the most skilful laborer, who provides himself with board and lodging, obtains from 1*s.* 8*d.* to 1*s.* 11*d.* per day. The vintager who is fed and lodged by his employer receives from 7*d.* *to* 1*s.* and sometimes 1*s.* 3*d.* per day. Women and children employed in the vineyards receive half the pay of the men. The workmen attached to the vine-press receive 4½*d.* per day more than the others. In the Medoc district, the vineyard is cultivated on the following terms:—A certain portion of land, generally about seven acres, is divided according to agreement, and it is then managed by the vine-dresser. It is his duty to cut the vines—prune the shoots—to tie them up in bundles and carry them out of the vineyard; and he also attends to all the necessary processes which the successful culture of the vine demands, such as loosening the ground about the roots of the plants, and breaking up the ground in places which the plough could not reach: all the other expenses are at the proprietor's cost. The vine-dresser receives a salary for himself and family of 6*l.* in money, besides half the cuttings, four barrels of a liquor called "piquette," made from the wastage of the wine-barrels, the remnants of the grapes, &c., a lodging, and a small garden. It is usual amongst the extensive growers of the Sauterne and Barsac grapes to employ whole families of vine-dressers to cultivate the crops at fixed wages. Each family is boarded and lodged on the estate, and has a small house, garden, hemp-field, and half the cuttings of the vines collected on the portion of ground they cultivate; and they have, moreover, permission to grow vegetables on several of the furrows in the vineyard. They receive besides, for each man and woman, fifty kilogrammes (110 lbs.) of rye, and half that quantity for each child. The head of the family receives an annual addition of from 2*l.* to 2*l.* 8*s.*; and a child, as soon as it commences working, is paid at the rate of 24*s.* a year.

The manager of a large wine property in Medoc gives nearly a similar account of the condition of the vine-dressers on the estate under his superintendence. A vine-dresser who is the head of a family, and whose wife works, receives from 18*l.* to 20*l.* a year in money, and is provided with four barrels of piquette, lodging, a garden, and land suited for the growth of hemp to supply the family with linen, and he has one-half of the refuse wood of that portion of the vineyard which he cultivates, besides medical attendance and medicines at the cost of the proprietor. This account adds that the ignorance of domestic economy amongst the vine-dressers is usually very great in the department of the Gironde. Another account says that instruction is but little diffused among them. Those who have learned to read when young, no longer think of reading at a more advanced age, although this is exactly the period when the greatest possible advantage would be derived from the perusal of useful books. When young, it is stated that they read nothing but the catechism and prayer-book, and a complaint is made that books of a more attractive kind are not circulated. As a consequence of this state of things, they are extremely fanatic, and having few sources of rational amusement and instruction, they either "go to bed early," for want of occupation, or spend their time at the public houses. M. Joannot says they are in general endowed with great penetration, but they are ignorant, superstitious, devoid of religion, proud, setting at defiance the educated and the rich, selfish, little fond of work; yet he states that they are kind and hospitable, adding, however, that family ties have little weight amongst them—the sickness of one of their cattle distressing them more than that of their wife or child. Almost all of them live without care for the future, and die unregretted. This is a disastrous picture of the moral state of so numerous a class, and it will require many efforts to lift them out of that degradation in which they are placed by reason of their ignorance of their own nature, and the duties which are imposed on them. France will soon be covered with parish schools, and the instruction which may be obtained there will, it is to be hoped, do something towards improving their character. We must add, that though thus spoken of, M. Joannot says "their sobriety is worthy of imitation."

In some parts of the department of the Gironde, where the elevation of the country renders the air extremely pure, the men are finely formed, have blue eyes and light hair, and pretty women are common among them. The population of these parts is much devoted to pleasure and dress, and they are of a gay temperament.

In the district where the Macon and Beaujolais wines are produced, M. Delahante, a public functionary, affirms that "it is certain that within the last twenty years civilization has made great progress among the population employed in the cultivation of the vine. There are few of the old people who know how to read, and few of the young who cannot do so."

M. de Brimont, of Rheims, says of the vine-dressers of the Champagne district, that as to education they are on an average with the population of France generally, "but they are more sober and orderly than the manufacturing classes in general."

From the Edinburgh Encyclopædia.

ON SEA-WEED, OR ALGA MARINA.

Sea-weed, a plant that grows upon rocks within the sea, is driven ashore after storms, and is

found to be an excellent article for manuring light and dry soils, though of little advantage to those of a clayey description. This article may be applied on the proper soil with advantage to any crop, and its effects are immediate, though rarely of long continuance. As the coast-side lands of the island are, in every case, of superior fertility to those that are inland, we may attribute this superior fertility to the great quantity of manure found upon their shores after every storm or high tide, whereby the resources of the ocean are in a manner brought forward for the enrichment of the lands locally situated for participating in such benefits. The utmost attention has long been paid to the gathering and laying on of this valuable manure; and, from the extensive line of British shores, both of the main sea and of the numerous estuaries which indent, and as it were divide the main land, an immense quantity of sea-weed must annually be collected from them.

Sea-weed is applied at all seasons to the surface, and sometimes, though not so profitably, it is mixed with unrotten dung, that the process of putrefaction may be hastened. Generally speaking, it is at once applied to the soil, which saves labor, and prevents that degree of waste, which otherwise would necessarily happen. Sea-weed is, in one respect, preferable to the richest dung; because it does not produce such a quantity of weeds. Some have thought, that the weeds upon land, which has received dung, are produced by seeds mixed with the dung; but it is reasonable to presume, that the salts contained in sea-weed, and applied with it, may be the real cause of the after-cleanliness. This may be inferred from the general state of coast-side lands, where sea-weed is used. These lands are almost constantly kept in tillage, and yet are cleaner and freer from weeds, than those in inland situations, where corn-crops are not so often taken.

Clay-soils are not so much benefited by sea-weed, as those of a light nature; but whether this is owing to the properties of clay being unfriendly to the admission of the salts contained in sea-weed, or to soils of that description being generally in a state, when this substance is thrown ashore, which physically unfits them for participating of benefit from the application, is not completely ascertained. The fact, however, is certain, that clay-soils are little benefited by sea-weed, though perhaps the poaching of carts and horses upon them, in wet stormy weather, may in some measure, be assigned as the true cause why the same benefit is not gained. When dung is carted out on clay-soils, in a wet state, we know, that the advantage from it is not so great, as when the surface is in condition to bear the pressure of the carriages; though, from that result, no person would be justified, in maintaining, that these soils were constitutionally disqualified to receive benefit from dung. When a coast-side farm contains mixed soils, the best management is exercised, by applying sea-weed to dry, and dung to clay-land. In this way, the full advantage of manure may be obtained, and a farm so circumstanced is of infinitely greater value, with respect to manuring and laboring, than one which contains so much variety.

It has lately been suggested by Sir John Sinclair, Bart. and other eminent agriculturists, that sea-weed possesses a virtue not formerly assigned to it; namely, that it is eminently beneficial in preserving wheat from being mildewed, which, were the fact sufficiently ascertained, would be an addition to our stock of agricultural knowledge, of great importance. Where sea-weed is applied, there can be no doubt that the soil is thereby greatly strengthened, becoming firmer, and, of course, better adapted for preserving the roots of the plant from injury, and for furnishing a regular supply of food. This length we can safely go, as we believe that such an opinion accords entirely with the general sentiments of agriculturists. Thinking, however, that mildew proceeds entirely from a diseased atmosphere, we are at a loss to find out how sea-weed, at the root of the plant, can act as a preventive against that disease, in any other way than what is already mentioned; that is, by consolidating the surface, and giving greater strength to the plants, in consequence of which, they are enabled to resist the unhealthiness of the atmosphere. Comparing the operation of sea-weed with that of dung, it will be found that the effect of the latter is to loosen the soil, and to make it more friable; consequently, as always happens, fields, which have received the greatest quantity of dung, are always most susceptible of mildew.

THE EDITOR OF THE GARDENER'S MAGAZINE.

The two last numbers of Loudon's Magazine contained nothing of interest, unless it may be the following advertisement, which exhibits a very different condition of agricultural editorship in England from that of our country. Mr. Loudon is evidently "in clover," compared to his over-worked and under-paid editorial brethren in this country. We could, (and perhaps may,) present some strong and amusing contrasts to the state of things indicated by this advertisement, in some of the heavy demands made upon our time, and labor of body and mind, by persons who are not even known, and whose names are sometimes not even given, and who seem to think that we are not only competent, but that it is our province and duty, and our pleasure, to furnish information and advice, at any expense of labor, not only on matters of general interest to agriculture, or of special interest to friends, acquaintances, or subscribers, but also to those who have no claim on any one of these grounds.—ED. FAR. REG.

Advertisement.

Since Mr. Loudon commenced the '*Gardener's Magazine*', he has had numerous applications made to him (many of them anonymously), by the readers of his works, for opinions on plans and elevations, or other designs; and for lists of trees and shrubs, ornamental or fruit-bearing, for particular purposes, &c. &c. These applications have considerably increased since the publication of the '*Suburban Gardener*,' and as they begin to occupy more of his time than he can afford to spare gratuitously, he has thought it right to state that, in conformity with the practice of other authors

on scientific subjects (see '*Gardener's Magazine*' vol. xiv. p. 526,) he intends to charge for this advice in future, whether given verbally to persons calling, or by letter. For professional visits he has, for the last thirty years, been in the habit of charging at the rate of five guineas a day; and the following scale of terms is founded on this datum:—

A visit to any place not exceeding twelve miles from London, and not occupying more time, including going and returning, than from 9 in the morning to 5 in the afternoon—including all expenses	£5	5	0
Above 12 miles, and not exceeding 20—including all expenses	6	6	0
Above 20 miles, five guineas a day, from the time of leaving Bayswater to that of returning to it, and travelling expenses, by post.			
Consultation by letter, or by the party calling at Bayswater	1	1	0

When plans are sent for correction, subjects for an opinion, or lists of trees, shrubs, &c. are wanted, which it will require a considerable time to prepare, the charge for consultation will be increased in proportion to the time occupied, at the rate of five guineas, for a day of eight hours.

As some persons may not be aware when a personal examination of their premises will be requisite, and when it will be sufficient merely to send a plan and description, with queries, &c. a few examples of both cases are given below.

I.—Cases in which an opinion may be given from documents, without Mr. Loudon visiting the premises:

Pointing out errors or defects in the plans of flower gardens, kitchen gardens, pleasure grounds, or entire residences, whether large or small; and in the plans of hot-houses, pits, and garden structures of every description, whether useful or ornamental.

Stating the defects or advantages of particular modes of heating or lighting hot-houses, and other buildings for plants.

Examining lists of trees and shrubs, ornamental or fruit-bearing; or supplying lists suitable for particular purposes and situations.

Examining plans, elevations, and sections of cottages, farm buildings, and villas of every description.

II.—Cases in which it will be necessary for Mr. Loudon to see the premises before giving an opinion:—

Where the general scenery of a place is to be examined, with the view of ascertaining what improvements it is susceptible of.

Where an entirely new place is to be formed; unless the ground should be perfectly flat, and without any distant view.

Where it is desired to ascertain the causes of the defects of an old place: such as the cause of the barren state of the fruit-trees, or of the defective crops of the kitchen garden or orchard; or of the inefficacy of the mode of heating, lighting, or ventilating the hot-house, &c.; of sterility of the pasture land, unthriving state of the timber, &c.

Where it is desired to ascertain whether a place is well kept, or whether it could be altered so as to be kept at less expense; or to point out defects in the mode of keeping and managing the walks and their edgings, and the lawn, flowers, shrubs, &c.

Whether the addition of a piece of water to a park or pleasure ground would be an improvement; how far it is practical to form such a piece of water; and what character it ought to assume.

Where the agricultural surface requires improvement, or the plantations are to be examined.

No opinion will ever be given by Mr. Loudon, whether verbally or by letter, without assigning his reasons for forming it.

When any plan given by Mr. Loudon is approved of, he can, if required, send a competent assistant to stake it out on the ground, and to describe the manner in which it is to be executed; for which the charge will be a guinea a day, with travelling expenses. J. C. L.

Bayswater, October 16, 1838.

From the New England Farmer.

EXTRACT FROM PROCEEDINGS OF EIGTH AGRICULTURAL MEETING IN MASSACHUSETTS.

* * * * * *

The report above named placed the value of ruta baga for fattening cattle, for milch-cows, for swine and for horses at a very high rate. Mr. Brigham of Westboro expressed himself as strongly differing from the opinions expressed in the report in respect to their value. He was disposed to value roots at a high rate; but there was danger that farmers might expect too much from them; and he wished to guard them against disappointment. He had in the course of his farming raised from 1000 to 1100 bushels to an acre of ruta baga; and of carrots from 700 to 1200 bush.

He had used his ruta baga from cows in milk. They will not double the quantity of milk as the report stated; but they will increase it considerably. He thinks, however, that the quality of the milk is injured by their use; and that the milk of cows fed upon them will produce but little cream. He had found them of use in fattening beef. On the whole, however, he deemed them greatly inferior to carrots. Carrots he estimated very highly. They were difficult or rather expensive in cultivation; but if successful, they amply repaid any expense or labor bestowed on them. They were an excellent crop for horses. He did not coincide in the opinion, stated by the commissioner, of Mr. Merrill of Lee, who said that for feeding horses he should prefer one hundred bushels of carrots and one hundred bushels of oats to two hundred bushels of oats; yet he deemed them excellent, and much the best root-crop raised among us. He had found it likewise much easier to keep carrots than to keep ruta baga. Of their value for fattening beef or swine he had no knowledge.

Mr. Danforth of Pittsfield, stated a case within his own knowledge in which the raising of carrots cost at the rate of eight cents per bushel. Other gentleman stated that they had been produced in the state in large quantities at the rate of 6¼ cents per bushel.

Mr. Abbot of Westford, was disposed to value ruta baga much higher for milch-cows than Mr. Brigham. In his own experience for the increase of butter, where he had tried cows in successive weeks upon pumpkins and ruta baga, the increase of butter in the use of the latter root was as 14 to 10. A gentleman of Portsmouth, N. H., within his knowledge had compared the value of carrots with potatoes in fattening beef; and in this experiment, thirty bushels of potatoes proved equal to sixty of carrots. It would have been very instructive if Mr. Abbot could have given the particulars of both of these experiments more fully; this we hope he will do, and we shall be happy to make the 'N. E. Farmer' the vehicle of such communications.

Mr. Perry of Bradford, spoke next of the value of roots. In relation to the keeping of vegetables he thought a good deal depended on the nature of the soil in which the cellar, where they were stored, was dug. It often happens, he says, that ruta baga will not keep in the same cellar in which potatoes and carrots may be kept. Of the value of ruta baga he gave an illustrution by an anecdote in which he was a party. He had been accustomed to supply a neighbor of his with milk. His neighbor inquired one time why the milk was not as good and as rich as it had been. Now this inquiry was made at a time when he had ceased to give his cows ruta baga, with which before they had been liberally supplied.

Mr. Buckminster spoke highly of the value of roots; but seems to be as hostile to potatoes as the late William Cobbett; from which it is but natural to infer that he has no Irish blood in him. He deems grain crops an exhausting crop, and potatoes particularly so. He thinks the evil complained of, by which the milk was injured in its taste, was occasioned by giving the animals too much.

The chairman stated that within his experience it would be safe to feed a bushel per day to an animal, provided they were kept at the same time on salt-hay.

Mr. Buckminster pronounced potatoes a very exhausting crop, and the cultivation not to be encouraged. To an inquiry as to the amount of potatoes usually raised per acre, he replied from one hundred to one hundred and fifty bushels, and gave it as his belief that the crop in Framingham did not exceed one hundred bushels.

Mr. Bruce of Grafton was disposed to defend the potato-crop; and pleasantly remarked that if he obtained not more than one hundred bushels per acre, he should be quite disposed to give them up. In his own cultivation he considered 200 bushels a light crop—350 bushels a good crop. He had raised 564 bushels to the acre, and was accustomed to use 40 bushels of whole potatoes for seed. He is accustomed to plant them in hills. He said the crop of one of his neighbors had exceeded 700 bushels to the acre. These were certainly cogent arguments in reply to the Framingham farmers.

Potatoes are without question an exhausting crop, and return little to the land, the tops amounting to a small matter. In our practice they are far from being an ameliorating crop, because they are cultivated in the most slovenly manner; they are in many cases not hoed more than once, and the weeds afterward usually abound, and cover the ground with their seeds. This however is altogether the fault of the cultivator, and not the crop. In neat and clean husbandry and at a yield of four hundred bushels to the acre, (and with less than this even the Framingham farmers ought not to be satisfied) they are a valuable crop; and an acre of potatoes will furnish a great amount of most nutritious food for man and beast; though Cobbett insists upon it they are nothing but so much dirt and water.

Mr. Denney of Westboro, stated that he had fed his cows with carrots and ruta baga; and that in changing from carrots to ruta baga the quality of the milk immediately became deteriorated.

EXPERIMENT WITH THE MARYLAND TWIN-CORN.

To the Editor of the Farmers' Register.

Chericoke, King William County,
March 23d, 1839.

As I believe the merits and demerits of the Maryland twin-corn, is still a mooted point, among my brethren of the corn planting and raising craft of lower Virginia, it may not be entirely uninteresting to some of the vocation, that I should state the result of an experiment made by me last year. I have now been planting the twin-corn four years, procured from Col. Mercer, of West River, Maryland, and doubtless the same corn as recently advertised by Mr. Sinclair, of Baltimore, as the "true tree prolific corn." But with entire deference to Mr. Sinclair's better judgment in the matter, I think he has given the corn a misnomer, and misrepresented some of its characteristics; it is undoubtedly a very prolific variety of corn, and it is very white, but I have as yet discovered nothing of a *tree character* about it; and it certainly matures from a fortnight to three weeks earlier in the tide-water country of Virginia, than the common corn grown with us. Like all other corn that I have heretofore met with, it is true, that it flourishes better, and produces more, in rich land than poor; but still my experience leads me to believe it as well adapted to the one as to the other, and that it will be found to produce on any land under similar circumstances, more than the usual varieties. Its advantages, as I think, consists in its being more productive, more forward, less liable to rot in the field, heavier than any kind we grow except the hominy corn, and consequently yieding more meal; and certainly one great advantage it has over most other kinds, it yields from five to ten per cent. more in shelling from the cob. It will resist the weevil too, longer than most corn grown with us, and the meal and hominy made from it, is generally allowed to be very superior. The stalk being smaller, it of course resists the drought better than the larger corn, as I had full proof the two last summers. As before stated, I have been growing the twin-corn for four years, and for two years previous to the last, (1838,) I had planted no other kind, and was well satisfied with the results, but some friends, in whose judgment and experience I had great confidence, as farmers, insisted upon it that I was deceiving myself, that it would not produce as much as the common corn of our country, determined me that I would make a fair experiment with it, and one of

the best varieties of the common corn grown in my neighborhood, highly esteemed by the friend from whom I obtained it, as well as others, they being confident it would produce more than the twin. When planting, I directed my manager, (an intelligent, observing, and attentive young man,) after laying off a piece of land ready for dropping the corn, the rows being all of equal length, to count the number of rows, and plant one half of the common, and the other of twin-corn. There proved to be 103 rows in the piece; he planted 52 rows in the common, and 51 in the twin, the distance both ways the same, 5½ feet by 2, all planted on the same day, in the same manner, and the culture throughout the year the same. The land was all pretty good for this section, but that on which the common corn was planted, I think rather the best. I have recently measured the piece of ground, and find it to contain 19 and a fraction acres. We were at every pains in gathering and measuring the corn, to avoid any mistake, and the result was, that the common corn made 58½ barrels, and the twin 99, from the 9½ acres each. I also tried on another farm a similar experiment, and the result was fully as conclusive. Some now object that the season did not suit the common corn; but I presume it was equally "fair for the goose as the gander," if the season had been more propitious, each, doubtless, would have made more. In consequence of the stalk being smaller, many think that the twin corn should be planted thicker than the common, but that I think a mistake, as I have always found there was double as many shoots on a stalk, as it could mature, and that it always bears in proportion to any reasonable distance you may give it, and the strength of land and seasons; I therefore, plant mine generally, as I would any other kind of corn, by giving distance sufficient; the ears are larger, and it is the better enabled to stand a drought, there being always more shoots than the stalk can mature, they will fill out, as the land and season may allow.

As the twin-corn has become more acclimated, the ears have become larger, and perhaps it may not be quite as forward as it was when I first got it; but in all other respects it appears to retain its original character—certainly its fecundity.

CORBIN BRAXTON.

THE LAW OF GEORGIA FOR ENCOURAGING SILK-CULTURE.

(Passed December 29, 1838.)

Whereas it is desirable that the culture of Silk should be encouraged within the limits of the state:

Be it therefore enacted, That from and after the passage of this act, whenever any person or persons, either individually or collectively, shall raise any silk within the limits of this state, he, she, or they shall be entitled to draw from the state treasury, a premium of fifty cents, for each and every pound of cocoons, so by him, her, or them raised, and ten cents per pound on each pound of good silk by him, her or them reeled from cocoons so raised, and the person or persons, so claiming the premium aforesaid, shall first exhibit the cocoons raised, and the silk reeled as aforesaid to one of the justices of the peace, within the county where the same shall have been raised, and the said justices shall thereupon examine the person or persons claiming the premium, as aforesaid, upon his, her, or their oath or legal affirmation, and shall require the party so claiming the premiums to swear or affirm, that the cocoons were raised in the state of Georgia, after the passage of this act, that the premium has not before been claimed by or paid to, any other person, for said cocoons or silk; and in relation to all other facts and circumstances, as may, in the opinion of said justice be connected with the raising or reeling of the same: and upon such evidence proving satisfactory to his mind, he shall thereupon make out and a sign a certificate with his seal thereunto annexed, which certificate shall be sufficient authority to his excellency the Governor, and he is hereby required to receive in his department the same, to whom said certificate is granted for the amonnt of said premium, as per said certificate to be paid out of any money not otherwise appropriated. This act shall be and continue in full force and effect, for and during the term of ten years, from and after its passage.

For the Farmers' Register.

ESSAY ON VEGETABLE PHYSIOLOGY.

[Continued from page 174.]

CHAP. VII.

GROWTH OF THE STEM IN LENGTH AND DIAMETER. GROWTH OF THE CELLULAR SYSTEM. GROWTH OF THE FIBRO-VASCULAR SYSTEM. THEORY OF DU-PETIT-THOUARS.

Having examined the internal structure of the stem, at some length, in the last two chapters, we will now direct our attention to the manner of its growth. A stem attains its full size by a double growth; first, in length, and second, in diameter.

A young shoot elongates, not by its extremity only, but throughout its whole length. We may satisfy ourselves of this in several ways. If we mark a young shoot, early in the season, at equal and known distances, and then examine it at intervals of a week or two, we will find, that as the shoot increases in length, the distance between these marks will increase proportionably. Or we may learn the same thing, by simply observing the distances between the leaves of a shoot at different times during its summer's growth. At first, the nodes, or points at which the leaves are inserted into the stem, are very near each other, and the leaves almost touch. As the shoot increases in length the leaves will be found further and further apart, though still maintaining the same relative distance from each other which they had at first. The growth of the young shoot proceeds in the way thus indicated, until it has attained its full length for the season. It afterwards undergoes no change in length; but its future growth depends upon the production of a bud upon its summit. This bud developes in the same way as the first year's shoot, and in its turn produces a bud, and in this way the stem goes on increasing in length from year to year.

That the upward growth of the stem takes place

altogether in the green shoot of each year, whilst the older portions of the stem undergo no change in dimensions, is proved by the following fact, known, I presume, to all. When a name is cut upon the bark of the beech tree (*fagus sylvatica,*) the tree may continue to grow until it has doubled its original height, but the name will never be raised further from the ground than the point at which it was originally cut. This process is the same both in exogens and endogens. It generally happens, that some of the buds with which a stem is furnished at the axil of every leaf, grow, and originate branches. When this is the case, the growth of these branches is precisely similar to that of the stem from which they sprung. The only thing which seems at variance with this account of the growth of a stem, is the absence of all branches from the lower part of it, that part commonly called the trunk. From this, some have inferred, that the portion of the stem which was originally included between the root and the lowest branch formed, which is generally not more than a foot or 18 inches in length, has subsequently expanded into the trunk. The true reason why there are no branches on the trunk, is, not that branches were never formed there, but that after they were formed, they have died and disappeared, from the operation of causes, which have been already explained, when treating of the tendency manifested by stems to a perfect regularity of growth.

The increase of a stem in diameter is owing, first to the developement of the cellular tissue, which grows in every direction; and second, to the production of the vascular and woody tissues. The horizontal expansion of the cellular system, is simultaneous with its growth in an upward direction, so that a young stem increases in diameter to a certain extent, at the same time that it grows in height. To this cause, the horizontal increase of the stem, during the early part of the season, is due. When the elongation of the stem has proceeded for a month or two, the formation of wood commences, and its deposition, either in bundles or layers, continues during the remainder of the growing season. All must have noticed the increased toughness of a shoot after it is a month or six weeds old. This arises from the formation of woody fibre, which commences about that time. As this fibre is deposited under the bark, it must of necessity increase the diameter of the stem; and to its formation, no inconsiderable portion of the increase in that direction, is owing. Such is a general account of the growth of the stem. We will now examine the subject a little more particularly.

As the cellular and vascular systems of plants grow in ways entirely different from each other, we will have to consider them separately. And first, we will attend to the growth of the cellular system. The best observations on this subject are those of Mirbel, contained in two highly interesting papers communicated to the French Academy of Science, during the years 1831-2. The plant on which he made his observations, was the *marchantia polymorpha;* a plant which is frequently to be met with in Virginia, growing in the immediate neighborhood of springs. It has no regular stem, and is in fact, nothing but a green leather-like leaf, irregularly lobed, and springing up in wet places only. His reasons for selecting this plant were, first, it is a cellular plant, containing no vascular or woody tissue, and on this account the better fitted for observation, when the manner of growth peculiar to the cellular tissue was to be ascertained. Second, it grows easily, requiring nothing but common water, and the access of common atmospheric air, to ensure its rapid increase; and third, its seed, or spores, as they are termed by botanists, consist of a single cellule each. The common puff-ball or snuff-box, as it is perhaps more commonly called, (*bovista nigrescens,*) is a cellular plant. If one of these, when ripe, be pressed by the foot, an exceedingly fine slate-colored powder flies out from the opening at its summit; the grains of this powder are the seeds, or spores, of that plant; and the seeds of the *marchantia*, are exactly like them, except in color. Had the botanist the power of creating a plant, for the especial purpose of making observations on the growth of the cellular system, he could not have made one better adapted to the purposes than the *marchantia polymorpha.*

Some of these seeds were laid upon moistened plates of glass, and placed in a warm damp room. When examined, after an interval of four or five days, a projecting point was noticed on each of them, which soon elongated into a slender tube. This tube then swelled out at its extremity, and became a second cellule, in every respect like the first. The newly formed cellule soon emitted a tube, and this grew into a cellule; and so the work went on. The plant, at first, appeared like a knotted cord; next, it seemed a shapeless mass of green matter; and finally, became leaf-like, and assumed the appearance of a perfect plant. According to the observations of Mirbel, there does not appear to be any fixed point at which a cellule shall give rise to another; and of course, a mass of cellular tissue may increase in every direction equally well. This is in accordance with the fact already mentioned, that the cellular system of a plant grows in all directions at the same time. Cellules, in some instances, produce others at a very rapid rate. Some species of mushrooms, plants composed entirely of cellular tissue, have been known to grow in a single night, from a mere point, to the size of a large gourd. In such a case, if the cellules are of the medium size, they must have been produced at the average rate of 4,000,000,000 per hour; a rate of increase so rapid, that we could hardly believe it, did not calculation show us that it must indeed be true.

Concerning the growth of the fibro-vascular system, *i. e.* the vascular tissue and woody fibre, there has been great diversity of opinion among botanists. By far the greater part of the observations which have been made, for the purpose of examining into this matter, have been made on exogenous plants; to these, therefore, our attention must be principally directed. But yet it should be remarked, we can admit no explanation which does not apply to endogens, as well as to exogens. The origin of the fibro-vascular system, is presumed to be same in both cases; and so also its developement, except in the single particular of its arrangement.

There are certain facts respecting the production of the wood, which have been established by careful and oft-repeated experiments. To these we will first attend. The first of these is, that the wood, or at least the material of which the

wood is formed, is elaborated in the upper part of the plant, and sent downward; and not in the root, and sent upward. This has been established by such experiments as the following: "Early in the spring, a tight ligature was tied around a young branch; and in this condition the branch was suffered to remain for the season. On examining it towards autumn, the part above the ligature, was found to have increased in size, whilst that below had remained unaltered. A ring of bark was removed from a growing stem of a young tree. When the wound commenced healing, the new woody matter was formed on the upper lip of the wound, and not on the lower." Second, the new wood is produced, either from the bark, or between the bark and the wood of the last year, and not by that wood. This was proved by Du Hamel in the following manner: Having carefully introduced plates of tin-foil, between the bark and wood of a growing tree, he suffered it to remain undisturbed for several years. On cutting across the stem, at the end of this time, he found that the new layers of wood had been deposited on the outside of the tin-foil, without in the least disturbing it. Third, the origin of the wood is in some way intimately connected with the action of the leaves. It has long been known that the diameter of a stem depends very much upon the number of leaves which it bears; that the larger the number of leaves developed upon a stem, the greater will be its diameter, and the more rapid its growth. And also, that the largest quantity of wood is always found on that side of a stem which developes most leaves. But had we only these facts, on which to base a judgment, we might hesitate which to consider the cause, and which the effect; whether to believe that the luxuriance of the stem arose from the increased number of leaves, or the increased number of leaves from the luxuriance of the stem. This question, however, has been determined by direct experiment. Mr. Knight stripped off the leaves from the upper portion of a young shoot; as the consequence, the shoot died as far down as the leaves were removed, whilst below that point, it flourished. He afterwards, insulated a single leaf, by removing a ring of bark, at some distance above the point at which it was inserted into the stem, and another at an equal distance below that point. In the course of the summer a perceptible increase in the wood took place above the leaf, but none below it. In another instance, he removed a narrow ring of bark from the lower part of a growing stem; the stem afterwards increased sensibly in diameter down to this ring, but not at all between the ring and the leaf next below it. From these and similar facts, he has inferred, that "the matter of which the wood is formed, is elaborated in the leaves and sent downwards." Fourth, the portion of wood formed each year, is entirely independent of, and distinct from, that of every other year; and when once formed, undergoes no change, except the slight change which takes place when it is converted from sap-wood into heart-wood. In confirmation of this, many curious facts may be mentioned. On what are called "line-trees," in the west, certain marks are made when the land is first divided off into lots. This is done by striking with an axe, so as to cut through the bark and two or three of the outer layers of the wood. If one of these trees be examined, say twenty years after the marks were made, no traces of them will be discovered on the outside of the bark; nor, if we cut into the wood, will we find any in the 19 outer layers; whilst we will find all the marks perfect in the 20th layer, the layer in which they were originally made; thus establishing the fact that, that layer has remained unaltered since its first formation, and that all the outer layers have been formed entirely independent of it. Good, in his 'Book of Nature,' states that in England, "dates of very remote national eras, and the initials of monarchs who flourished in early times, have been found stamped in the very heart of the timber." M. Klein states that in the year 1727, a long series of letters were discovered in the trunk of a full grown beech, near Dantzic. The letters were conspicuous in a layer about half way between the axis and the bark of the stem, whilst no traces of them could be discovered, either in the layers within, or in those without it. The same author mentions several other facts of the same kind. "In one instance, the image of a thief hanging from a gibbet, was discovered, in the timber of a beech tree, apparently drawn by nature's own pencil. In another tree, the figure of a crucified man, was found in similar circumstances; and in another, a chalice, with a sword perpendicularly erect, sustaining a crown on its point. Such marks were formerly attributed to miraculous intervention, or regarded as marvellous sports of nature; and on this account, were preserved with peculiar care." When rightly understood, they place the truth of the above statement beyond a doubt.

Bearing these facts in mind, we will now attempt to decide between the two theories respecting the formation of wood, which, at the present day, divide botanists. Only two theories are mentioned; for although, in time past, many theories have been advanced, there are now but two which are considered at all probable. One of these theories is, that the wood is produced from organizable matter, elaborated in the leaves, and from them sent down, through the liber and alburnum, and thence deposited between the two in the form of new wood and bark. The other theory is, that the wood is nothing more than the roots of the leaves, growing downward from their bases, just as true roots grow from the base of the stem. The first of these theories is adopted by Mirbel, and De Candolle; the second was first advanced by Du Petit Thouars, and has lately been very ably defended by Prof. Lindley.

One of the arguments urged by the advocates of the first theory, is this: "If a ring of bark is removed from a maple tree, whose wood is white, and its place carefully supplied by a ring of bark from a maple, whose wood is red, the bark will adhere to the old wood, uniting organically with it, so that externally, the wound will be scarcely seen. If the tree thus treated, be allowed to grow for a year or two, a quantity of wood generated in the leaves, will be found beneath the ring of the red wood maple bark. If it be but the roots of the buds and leaves furnishing white wood, it should be white also. But it will be found that red wood will be formed beneath the red wood bark; therefore this wood is formed immediately by the bark, from materials sent down by the leaves." To this, Lindley replies, "the color of young wood depends entirely, and of old wood in

a great degree, upon the cellular system, and not upon the fibro-vascular system;" and according to both theories, this grows horizontally, the new portions originating in the cellules of the bark. There is another fact, which Mirbel has urged against the second theory, and in support of the first. "Suppose," says he, that a scion of *robinia inermis* has been grafted for a long time, say 30 years, upon a young stem of *robinia pseudacacia*, or common locust, cut off six or eight feet from the ground. According to the theory of Du Petit Thouars, what has taken place during the thirty years which have elapsed since the grafting? The leaves of *robinia inermis* have each year sent out roots, which, under the form of a layer of wood, have insinuated themselves between the wood and the bark of the *robinia pseudacacia*, extending quite to the earth. Thus the trunk has successively acquired thirty layers of the wood of *robinia inermis*, since they have been produced by the leaves of that species; and these layers, one after an other, have been divided in the soil, and spread in the form of roots, which are also those of *robinia inermis*. Now if we cause these roots to develope buds, and thus form new stems, we should, according to this theory, obtain stems of *robinia inermis*. But such is not the fact. These roots give rise to stems of the *robinia pseudacacia;* and consequently, their specific organization is that which is peculiar to the latter species." To this objection of Mirbel, an answer of the same kind, as in the last case, may be given, viz.: that the roots are really those of the *robinia inermis*, so far as the fibro-vascular system is concerned; but that the specific power of originating buds, lies in the cellular system, and both theories regard that as produced from the cellular system of the original stump of *robinia pseudacacia*.

The great objection to the first theory, *i. e.* the theory which regards the fibro-vascular system, as organized matter deposited by the bark, is, that it does not account for the growth of endogens, plants which have no regular bark; or if we consider the external covering of the stem as the bark, which form their fibrous bundles, without their having any connexion with that bark. As has been before remarked, we can admit no explanation which does not account for the growth of endogens, as well as exogens; the separate portions of the fibro-vascular system being precisely similar in the two cases, excepting in the one particular of their arrangement; their origin and mode of developement is presumed to be the same.

To the theory of Du Petit Thouars no such objection can be urged; it accounts for the growth of both kinds of stem equally well. And here it may be worth while to state this theory, as modified by Prof. Lindley, a little more at large. "A plant, in the first stages of its growth, is considered a mass of cellular tissue, capable of expansion, and growth in all directions. When there is no leafy system, growth is indefinite; and not carried on in any particular direction, and no woody system is formed; but when leaves are developed, they send their organic fibres down through the mass of cellular substance, and arrange them sometimes in one way, sometimes in another, according to the specific power of the plant. Upon this supposition the stem of a woody plant will be composed of two essentially distinct systems; the one cellular, constituting the pith, the principal part of the bark, and the medullary processes (if in an exogen,) and capable of growth in all directions; the other fibro-vascular, comprising the wood and a part of the bark, and capable of growing longitudinally only." "The stem of a tree has been quaintly, though not inaptly, compared to a piece of cloth; the cellular system representing the woof, and the fibro-vascular system the warp." The observation which seems first to have suggested this theory to Du Petit Thouars, was his noticing in the case of the *dracena*, (a plant used for forming hedges, in the Isle of France, where he then resided) the manner in which a bud vegetated upon a stem otherwise dead, a thing which frequently happened, the bud having no longer a series of vital systems, with which it might combine, sent out undoubted roots beneath the bark, instead of the woody fibres, which it would have emitted under ordinary circumstances. And also, that in cases, when the wood had died, the living buds formed a sort of entangled sheath of roots, by the fibrous matter which they sent down.

In support of this theory, Professor Lindley urges the following facts. "If you take the branch of a lilac (*syringa vulgaris*) when it is just clothed with leaves, and while the bark will freely separate from the wood, and peel it, you will find ridges of tubes, passing down from each leaf, turning aside at every little obstacle, re-uniting after the obstacle is passed, and together forming a firm fibrous case to the subjacent wood of the previous year. In other plants, the fibres may be traced in like manner from the leaves; but instead of running parallel with each other, they cross each other diagonally, and form a sort of lozenge work. This is wholly inexplicable upon the supposition that the wood is deposited by the bark; but it is clearly intelligable, if the wood is regarded as an organic emanation from the leaves. Again, in endogens, the woody fibres may be distinctly traced into the leaves, from which it is plain that they originate; and in this case at least, it is manifest, that the woody bundles, cannot be organized matter, deposited by the bark; for they are in the centre, whilst the bark is at the circumference." In addition to this, we may mention the fact, that when plants are propagated by means of slips, the new roots always protrude from between the outer layer of wood and the bark, which is just the situation from which they should grow, if this theory be the correct one. Du Petit Thouars attributes to leaves and buds, a power similar to that possessed by the seed, of sending a stem in one direction, and a root in another. The root of the leaf, however, differs from that of a seed, in being intended to grow in the trunk of the plant producing it, and not in the earth. This theory furnishes us with a very simple explanation of the manner in which a bud or graft is enabled to live, and incorporate itself with the stem of another plant. In inserting a graft or bud into the stem of a plant, we are placing it in as proper a situation for it to grow, as we are a seed when we place it in the earth. It will also show us the reason on which certain practical rules to be observed in grafting and budding, are founded. One of these rules is, that we must make the bark of the graft and that of the stock, coincide exactly with

each other; and if the barks are of different thicknesses, the inner surfaces, and not the outer must coincide. This is evidently necessary, in order that the "leaf-roots" growing down between the bark and the wood of the graft, may enter between the bark and the wood of the stock. Another rule is, that both in budding and grafting, we must place the bud or graft upon a stock which has a bark similar to its own, and upon no other. By a similar bark, we mean one which has the fibres of its fibro-vascular system arranged in the same way. If these fibres lie parallel in the bark of one, they must lie parallel in the bark of the other; if they cross each other in one, they must cross each other in the other also. Thus, we may graft a pear upon an apple stock, or an apple upon a pear stock; but neither of them upon a peach stock. We may bud a peach upon a plum, or a plum upon a peach; but neither of them upon an apple. If we graft a shoot, the fibres of whose bark lie parallel to each other upon a stock the fibres of whose bark cross each other, the fibres of the former in growing down among those of the latter, become entangled and cannot proceed far. Another rule is, to graft or bud before the leaves have put forth. The reason for this rule is, that then the roots from the new leaves have not as yet put forth, and of course are not injured.

Such are some of the facts by which this theory is supported; and such are some of the applications which may be made of it, for the purpose of explaining phenomena presented in the vegetable kingdom. Still it must be confessed that the arguments in its favor, are not so convincing as could be desired; and moreover that there are some objections to it, which do not admit of so satisfactory an explanation, as those already mentioned. One of these, and the most weighty one too, is, that when a deep cut is made into one side of a tree, the leaves which are perpendicularly above it, do not always, or even generally, die. Nor if after the leaves are fairly formed, each one has its own proper root, extending down into the ground, we must of necessity, in cutting into the tree, cut off the roots of many of them; and their life should be destroyed as the consequence. The only answer which can be given to this, is, that although in ordinary circumstances, each leaf is sustained by its own roots or fibres, yet, in extraordinary circumstances, it may derive its nourishment from the soil, through the intervention of those of other leaves. Or, carrying out the figure which Du Petit Thouars has used, in calling a tree a community of leaves, although each leaf, while hale and sound, must labor for its own subsistence, yet when injured or disabled in any way, it is supported by a tax levied upon its neighbors.

This theory, if we adopt it, will present the vegetable kingdom to us in a light very different from that in which we are in the habit of regarding it. We can no longer look upon a tree as an individual in that kingdom; so far is it from being such, that it is in fact, a vast collection of individuals, all united under one common cover, and for one common purpose. Each generation of leaves, borne up upon the shoulders of those preceding it, is raised into the air, and better fitted for performing its vital functions. This subject is one which, among botanists, is exciting a good deal of interest at the present time. It is always pleasant, and generally profitable, to know what are the current subjects of investigation; even though but little is, as yet, known respecting them; to see in what direction mankind are pushing their discoveries, even though they have, as yet, proceeded but a little way. This must be my apology for occupying so much space as I have, with a discussion of these theories.

Chap. VIII.

LEAVES. THEIR GENERAL STRUCTURE. ARRANGEMENT OF THE CELLULAR AND FIBRO-VASCULAR SYSTEMS IN THE LEAF. OFFICE OF THE LEAF. DISPOSITION OF LEAVES ON THE STEM. FALL OF THE LEAF.

The third, and last, of the organs of vegetation, are the leaves. In examining this class of organs, the same order will be preserved, as in the case of the root and stem; attending, first, to their external forms and internal structure, and then to their uses and manner of growth.

The leaf, like the root and stem, consists of a cellular and of a fibro-vascular system, entirely distinct from each other; the latter, forming what has been termed the skeleton of the leaf; the other, like the flesh in the human body, lying upon this skeleton, and filling up its interstices. The fibro-vascular system, composes what are called the veins, and sometimes, though very improperly, the nerves, of the leaf. The cellular system forms the fleshy part, or, as the botanists call it, the parenchyma of the leaf. The tubular vessels, and woody fibre, enter the leaf at its extremity nearest the stem, technically called its base, in a few distinct bundles; but soon after, these bundles divide and sub-divide, until at length, not more than two vessels are left together; one for conveying the sap, in its crude state, out from the stem; the other for returning it to the stem, after it has undergone certain changes in the leaves.

Leaves are arranged in classes by botanists, according to the manner in which the fibro-vascular system is disposed throughout the parenchyma. The principal of these classes are, 1st, that in which the bundles of fibres, after entering together, at the base of the leaf, diverge, and their subdivisions in no instance cross each other. Of this class the leaves of the red maple (*acer rubrum*) afford an example. Such leaves are said to be radiant-veined; and sometimes, fork-veined. 2d, that in which the primary veins diverge from the main vein, or mid-rib, like the plumes of a feather. Of this structure, the leaves of the chesnut and chinquapin (*castanea vesca* and *pumila*) are instances. Such leaves are called feather-veined leaves. 3d, that in which the several veins proceed without branching, from their origin at the base to their termination at the apex of the leaf. The veins, in such leaves, are connected by minute veinlets, passing at right angles from one to the other. The leaves of grasses belong to this class. Such leaves are called parallel veined leaves. On examination, it will be found that almost all leaves have their fibro-vascular system arranged in one of these three ways; and further, that the vast variety of form which we notice in the

leaves of different plants, arises from the more or less abundant developement of the cellular system.

In order to make this matter plain, "we may conceive of a leaf, as formed by the protrusion of a portion of the medullary sheath of an exogen, or of one or more of the vascular bundles of an endogen, into the bark; which, at this early period, consists wholly of cellular tissure, invested by a cuticle. The continued extension of the fibrous portion pushes outwards the fold of soft bark in which it has insinuated itself; and at length the fibres diverge from each other, in a horizontal direction, and carrying the cellular system with them, produce the flat and dilated figure of the leaf."—This, however, it must be recollected, is not advanced as a true account of the manner in which a leaf is formed; but only as something which we may suppose to be true, for the purpose of tracing out the analogy existing between leaves, which at first sight would appear to have nothing in common.

Adopting this supposition, let us see how each leaf would be formed. We will commence with radiate-veined leaves. If the parenchyma is abundant, so as to fill up all the spaces between the veins, we have a rounded leaf, as in the *ranunculus abortivus*. Where the parenchyma is less abundant, we have a leaf, still rounded in its general shape, but lobed or toothed along its margin; as in the *ranunculus recurvatus*. Where the parenchyma is still less abundant, these indentations will extend nearly to the base of the leaf, and thus the palmate, or hand-shaped form of that organ, will be produced, as in the *ranunculus seleratus*. Where the parenchyma, is only sufficient to form a covering for the veins and sub-veins, we have the multifid or many-parted form of the leaf; as in the *ranunculus fluviatalis*. Such a supposition as the one adopted, is not entirely gratuitous, for in many genera of plants, as in that of the *ranunculus*, or butter-cup, from which the above instances are taken, we notice all the intermediate forms, between an entire and a dissected leaf; indeed a large part of the series is often presented by the leaves of a single plant.

If we take the feather-veined leaf, and conceive the parenchyma to be so abundant, as to fill up all the spaces between the veins, we shall have an entire lance-shaped leaf, as in the peach, (*amygdalus persica.*) If the parenchyma is less abundant, we shall have a lobed or toothed lance-shaped leaf, as in the scrub-oak, (*quercus catesbaei,*) or in the beech, (*fagus sylvatica.*) If we conceive it to be sufficiently abundant, and so arranged, as to fill up the interstices between the secondary divisions of the vascular system, but not those between the primary, we have a compound leaf, in which the several leafets are arranged in lines, on both sides of the mid-rib, as in the yellow locust, (*robinia pseudacacia.*) If we conceive the interstices between the tertiary divisions of the vascular system to be filled with parenchyma, whilst those between the secondary and primary divisions are not, we have the decompound leaf, such as that of the honey-locust (*gleditshia triacanthos.*) Again, if we take a parallel-veined leaf, and conceive all the interstitial spaces between its veins to be filled up with parenchyma, we shall have the linear leaf, like those of grapes. If we conceive each vein to have only sufficient parenchyma to cover it, we shall have a leaf like that of the pitch pine (*pinus rigida.*)

Without pursuing this examination further, we will notice, that in every variety of leaf there is some part of the vascular system in contact with every part of the cellular system. The peculiar office of the first, is believed to be, that of conveying liquids to and from the latter; whilst the office of the latter is to elaborate the sap. The whole leaf may be compared to a manufacturing town; the veins being the streets, through which the raw materials are brought in, and the manufactured articles carried out; whilst the rows of cellules are the shops, in which the manufacture is effected. Such is the arrangement, that there is no street, which has not its row of shops, and no row of shops which have not their street.

If we examine the internal structure of the leaf more minutely, we will discover in every part of it, an admirable adaptation to the same end. The process termed elaboration, consists in the conversion of the crude sap into the different proximate principles, or "compound elements," of plants; such as sugar, resin, &c. This process, as has been already mentioned, is believed to be principally performed in the leaves. To its performance, the evaporation of water, and the absorption of gaseous matter from the atmosphere, appear to be indispensibly necessary. If with a powerful microscope, we examine a cross section of an apple leaf, we will notice, along the upper and lower surfaces, a thin transparent membrane; this is the cuticle, and envelopes the whole leaf. Immediately below this, there are three or four strata of spheroidal cellules, closely packed together, and so placed as to have their greatest diameter perpendicular to the surface of the leaf. Below these, and next the lower surface, we will see three or four more strata of cellules, very irregularly placed, and very loosely packed together. The upper part of the leaf has a compact structure; the lower, a cavernous one. And hence, in part, arises the deeper color of the upper surface. When we call to mind the fact, that it is the upper surface only which is exposed to the direct action of the sun, we will see, in the more compact arrangement of its cellules, a provision to prevent a too rapid evaporation of its liquids.

The cuticle, which covers the upper surface of the apple leaf, is nearly entire throughout; whilst that which covers the lower surface is pierced with numerous holes. Through these openings, the gaseous matter necessary for the sustenance of the plant, is absorbed; hence they have received the name of breathing pores. In consequence of its cavernous structure, the lower part of the leaf, presents a much larger cellular surface to operate upon the air, than the upper. In aquatic plants, whose leaves float upon the surface of the water, and of course have their under surfaces cut off from all communication with the atmosphere, the structure of the leaf is reversed. The breathing pores are all on the upper side. In grapes and other similar plants, whose leaves grow in a nearly perpendicular direction, thus exposing both surfaces alike, to the action of the sun and the atmosphere, the breathing pores are about as numerous on one side as on the other. That such is the fact, will be evident, from the following statement of their number, on the upper and lower sides respectively, of the leaves of several plants, as given by Prof. Lindley:

In one square inch of the	upper surface ;	under do.
Hydrangea quercifolia, (hydrangea,)	none.	160,000
Peonia, (peony,)	"	13,790
Pyrus, (pear,)	"	24,000
Hypericum grandiflora, (St. John's wort,)	"	47,800
Arum dracontium, (water turnip,)	800	16,320
Alisma plantago, (water plantain,)	12,000	6,000
Iris germanica, (blue iris,)	11,572	11,572
Dianthus cariophyllus, (June pink,)	38,500	38,500
Tradescantia, (spider wort,)	2,000	2,000

The leaves of the four first mentioned of these plants, grow like those of the apple ; those of the next two, lie partly upon the water; whilst those of the last three, grow like those of grapes.

In the arrangement of the fibro-vascular system of the leaf, we may notice an adaptation to the same end, as in the cellular. The vascular system, which pierces the parenchyma in every direction, consists of ducts and spiral vessels, surrounded by woody fibre. The use of the fibre is evidently to give strength and support to the parenchyma, and protection to the tubular vessels. The bundles are largest as they enter the leaf, and gradually diminish in size, towards the extremity of their ramifications, till they altogether lose themselves in the parenchyma. In this we notice a remarkable resemblance to the circulating system in animals. But are there separate sets of vessels for conveying the sap outwards, and for returning it again to the trunk? As I have already mentioned, there is believed to be. Not that we are able to demonstrate the fact by actual examination; for to the eye, even when aided by the most powerful microscopes, the smaller veins seem to be altogether single. But then "it is well known, that when a leaf has been macerated till the parenchyma is quite decayed, the veins will separate into an upper and lower stratum, so neatly and regularly, that it is impossible to doubt, their having originally consisted of two distinct systems, the one placed above the other. As the sap is propelled from the wood into the leaf in a crude state, and returned into the bark in an elaborated state, and as the veins are evidently connected with both the wood and the bark, it is inferred, that the upper of these layers is for the outward flow of the crude sap, and the lower layer for the backward flow of the elaborated sap." As we shall have occasion, when speaking of the food of plants, again to recur to the internal structure of the leaf, we will dismiss it for the present.

Leaves in their position on the stem, always observe some particular order of arrangement; and this order is uniform in the same species. The most common orders of arrangement are, that in which the leaves are placed alternately ; and that in which they are placed opposite to each other. Respecting the first mode of arrangement, we may notice, that the leaves are seldom placed one above another, on exactly opposite points of the stem ; but usually the second leaf is a little to the right or left of the point directly opposite the first ; and in like manner the third, a little to the right or left of the point directly opposite to the second ; so that tracing along the bases of the leaves of a branch, we describe a simple spiral. When the leaves are quite close, the spiral arrangement is very evident ; when widely scattered it is less so, but yet may be discovered by close examination. In the apple tree the spire consists of five leaves ; the sixth forms the commencement of a second series, and is placed directly above the first. This is the most common number in the spirals of alternate leaves. "The spiral arrangement of leaves is a beautiful provision for securing the symmetry of the branches; the wood being formed by the action of the leaves; if these were not placed in regular order over every part of the circumference, more wood would be deposited on some sides of the stem than on others. So when the spire is reduced to its simplest state, that of two leaves, or in other words, when the leaves are alternate, in the strict sense of the term, the stem is usually two-edged, or flattened from this very cause. In opposite-leaved plants, the pairs are placed in an alternate manner with respect to each other, that is, the second pair is at right-angles with the first, the third pair exactly over the first, and the fourth over the second. It results from this disposition, that the stems of opposite-leaved plants, are commonly more or less four-sided, instead of being cylyndrical, as in alternate leaved plants."

During that continual elevation of the sap of plants, which takes place in the cellules of the leaf, these is always more or less solid extraneous matter left behind. In the structure of the leaf, there is no provision made for getting rid of this. It of course accumulates in the cellules, clogs their vital action, and renders them stiff and hard. By the close of summer, the cellules become so much clogged, as to be unfit for the further performance of their functions. In the fall of the leaf, we see a wise provision of nature, for getting rid of such portions of the vegetable structure, as are no longer fit to fill their place in the economy of vegetable life. Hoary headed winter removes the worn out machinery, to make place for a new set, which the hand of spring shall supply. But how is the fall of the leaf brought about? It is generally said to be caused by its death. If this be the fact, why is it, that when a tree is killed during the summer, by lightning or some other violent means, the leaves instead of falling, remain attached to the stem until they actually rot off? The true explanation of the matter appears to be this. When the leaf and the stem are both growing, and in a healthy state, the base of the leaf and the branch which bears it, increase at the same rate, and there is no interruption to their mutual adaptation to each other. But when at length the full grown leaf looses its vigor, by the deposition of extraneous matter in its substance, and thus becomes rigid and unyielding, its base can no longer adopt itself to the growing stem. This happens at just the time at which the stem is growing most rapidly, from the deposition of wood beneath its bark. In this way, the union of the leaf with the stem is weakened, the connecting vessels are broken off, and so soon as the frost of autumn has finished the work, it is ready to fall before the first blast. This explanation accounts for the early fall of the lower leaves of herbaceous plants ; and for the fall of the old leaves of ever-greens, at the time when the wood of the ensueing summer is being deposited. It also accounts for the fact, that the leaves of endogens, a class of stems which admit of no increase of diameter after they are once fairly formed, do not fall, but simply perish and decay upon the stem, as is witnessed in the leaves of corn and all grasses.

Leaves differ very much from each other in their size ; some being nothing more than minute scales, in which you can hardly detect a distinct organi-

zation, without the aid of a microscope; and others 30 feet in circumference. "The leaves of the bujoor palm of India (*corypha elata,*) often measure 30 feet in circumference, and have a stalk to support them 12 feet long; so that if placed on the ground, one of these enormous leaves would be four times as high as a tall man. There is no machine of human invention, however extensive and complicated, which can for a moment be compared, with such a natural apparatus as this for wonderfully elaborate mechanism. Its digesting cells are infinitely more numerous than all the houses of London and its environs; and all the streets, alleys and passages of that huge metropolis, shrink into insignificance, when contrasted with the myriad ramifications of the veins of such a leaf."

(To be continued.)

REMARKS ON THE IMPROVEMENT OF LAND, BY LIME, &c. CULTIVATION OF CORN.

To the Editor of the Farmers' Register.

Fredericksburg, April 2nd, 1839.

Your April No. of the Farmers' Register has been read with pleasure, greatly enhanced by the valuable article of Commodore Jones. This gave me the more pleasure, as it was an example in proof of a fact which I had stated in an account current in the first No. of this volume of your work. In the name of *Stafford*, and the environs of Fredericksburg, I thank Com. Jones; and I sincerely hope his example may be profitably followed; not only by those holders of poor land I take the liberty of representing in Stafford, from my pre-eminence as the owner of the poorest; but by all in the poor old state of Virginia. I have been for some time gathering leaves, turf, and mould, from the woods and fence rows, on a piece of land destined for a truck patch. This vegetable matter, after being scattered, I intend to lime with about 70 bushels to the acre, and plaster with at least one, before turning in. I hope to make something from it this year, but shall calculate on a fine return next year, when all will have decomposed and become mixed with the soil. The result of this application I will acquaint your readers with in December, if I am then in the land of the living.

In corroboration of the article of Mr. Newton, and in direct contradition of the statement he refutes, I can say, that in 1830, I limed 16⅔ acres of land with 100 hogsheads of shells, well burned, and applied according to the directions of F. Lewis, esq. of Weyoke—scattering the lime on the land after it was ploughed, and harrowing it both ways, the better to mix it. The crop of corn immediately following the application, was much better than on the adjoining lands, and all crops have continued to improve on it from that day to this. The land is of a darker and richer color, and is in every respect improved by the application of the lime. What will become of our marl if shell-lime is not valuable? I may state here, however, that I have invariably seen much greater effects, from the application of eocene marl, than from the experiment with lime spoken of above. Indeed, I have witnessed effects from this invaluable substance truly magical; and I hope to see the whole tide-water district of Virginia blossom as a rose, under its application, and your auspices.

This substance rests in a great quantity, entirely undisturbed, on the banks of the Rappahannock, while gold mines are sunk in the bowels of the earth, and the thoughts and hands of all the people, are engaged in counting multicaulis or bass buds, as the case may be.

From my experience in cultivating corn, on the light and truly corn lands in the tide-water district of Virginia, the culture so successfully pursued by Major Steger of Amelia, would not answer with them, unless where the land was extremely rich, so as to force the corn forward faster than the grass. On land making from four to five barrels per acre, I have invariably found it necessary to use cultivators, skimmers, or hoes, and more frequent ploughings, in order to keep under the grass until harvest; directly after which, it is generally the custom to run over the corn lightly for the last time. I would recommend the mode of culture spoken of by Mr. Hill in the third No. of the 7th volume of the Register, as much to be preferred to that of Major Steger, as mentioned in the same number by Wm. H. Harrison of Amelia, on all such lands as are usually found on our tide-water rivers. Very rich land, in good tilth, will make corn with almost no working at all; but inferior land, to make a good crop and a saving crop, requires judicious nursing. My experience in the Maryland corn, agrees with the statement of Mr. H. It will make more on rich land; on thin land it is very inferior to the more common productive sorts of corn in general use.

This hasty scrawl is really so unconnected and desultory, that I am at a loss to know what to do with it—whether to put it in the fire or trouble you with it; "in for a penny in for a pound," however. I will give you some further statements, and then let its fate be decided by yourself, hoping that you will not occupy valuable room in your paper with such stuff, unless you really deem it of some value.

Let me recommend root-culture to all my brother farmers. I have never had to regret any labor bestowed in this branch of husbandry, but have always reaped a full reward for it. More especially, let me recommend the Jerusalem artichoke, as a very valuable root for the feeding of hogs and cows, especially if well steamed or boiled with a little mixture of grain or meal of some sort. It is valuable because very productive; because very easy to cultivate; because sure to yield a crop in all seasons; because easily harvested, and because eaten greedily by swine and neat cattle, very much to the advantage of both.

In connection with a steamer, let me recommend two implements, by no means in general use. Green's straw-cutter, the very best machine I ever saw for cutting hay, straw or fodder; and an English malt-mill. I got one some years ago from Thomas A. Rust, of Richmond, and find it invaluable for chopping corn, peas, rye, &c. into a fine small hominy for feeding. It will make good meal, but then the labor is considerable; but one good hand will grind a quantity of fine hominy, or chop, in a *short time* and with *ease*. It is valuable any where, but on a large farm where there is a great deal of trash corn, wheat, peas, rye, &c. and at a place inconvenient to a mill, it is particularly so. The cost of each is about $30, and I think it is money well laid out, if they are carefully and judiciously used after they are procured.

With earnest wishes for the continued success of your Register, I am your

CONSTANT READER.

For the Farmers' Register.

EASTERN VIRGINIA.

We often see in our public prints, long speculations in the shape of Jeremiads, reciting all imaginable causes for the decline of our state, and bewailing, in most piteous terms, this sad catastrophe, as if the besom of destruction had literally swept the land.

It may be true that the state is declining, but the evil is greatly magnified by desponding; idle croakers who seem to take pleasure in vilifying and abusing the country, which ought to be as dear to them as life. With one voice, we will cry out, "is there no balm in Gilead!" but, when it is within our reach, we will not put forth a hand to receive it.

Our country is acknowledged, by all who have seen it, to be peculiarly rich in natural resources; yet what feeble efforts have been made to develope them! How must the proud son of Virginia blush when he visits the north, east and west of our vast confederation, and sees how our brethren have every where outstripped us in enterprise and improvement! He returns to his home; the high spirit which is yet born with every *gentle* son of our state, has been roused and excited by all he has seen; nothing goes on fast enough for him now; he is no longer satisfied to live in comparative idleness; he has not patience, or perhaps cannot afford, to follow the tardy course of a "liberal profession" in Virginia: the result is, that he goes off to a new country," where, if he can escape the perils of "flood and field," and the horrors of noisome pestilence, he may hope to acquire wealth enough to enable him to return and spend the evening of his days at the home of his youth, and rest his bones in his native soil. This hope is never realized; he becomes identified with his adopted land; soon learns the law of "hardest fend off," and is as thoroughly *dishumanized* as the veriest "hoosier" or "salt river roarer," about him.

It is thus that our finest young men are lost to the state. We must work a cure of this evil, and then, and not until then, will our "*Alma Mater*" recover her former glory. It must be a gradual process; we must teach our youth to give up the notion that law, medicine, and politics are the only "liberal" pursuits; and qualify them to enter the various channels for industry and enterprise which present themselves on all sides, and are left vacant because not thought sufficiently *respectable* for *gentlemen*. Above all, we must teach them by precept and example, that we can be sufficiently *respectable* as cultivators of the soil, even on a small scale, and that our soil is susceptible of great improvement.

A large portion of eastern Virginia is eminently adapted to agriculture. The lands, though very fertile when cleared, are generally very much exhausted by injudicious culture; they may, however, be readily restored by proper management, and rendered even more productive than they were when new. It was to be expected that the style of living and the wasteful system (or want of system) of farming practised throughout this country, would break down the overgrown estates which covered it: these estates have been cut up and divided for the most part, and the holders are beginning to discover by slow degrees, that their forefathers were not infallible adepts in the art of farming; they are now yielding reluctant assent, and some show of obedience to the excellent precepts of the Farmers' Register. The farmers are more generally out of debt than they have been for many years, as many of those who were involved have sold negroes at the late enormous prices, and freed themselves from their embarrassments. Such is the present condition of a country whose inhabitants have attained a high degree of moral cultivation, and have been distinguished for talent, kindness, and hospitality.

The present distressed condition of the whole union makes each state show out in her true colors, and is calculated to have a happy effect on our people, healing the blindness and infatuation with which they regarded the new states, checking emigration, making them better satisfied with home, and teaching them the difference between extravagance and generosity; so that there never has been, and never will be a better time for reforming our system of agriculture. Let us set to work to improve our lands, and let every thinking man inculcate upon all the young farmers whom he can influence, the homely virtues of industry and frugality.

Let us stop the drain of emigration, and learn our young men to work, and Virginia may yet shine forth a star of the first magnitude.

A RECLAIMED WANDERER.

From the Farmers' Cabinet.

A GOOD COW, GOOD BUTTER, AND A GOOD DEAL OF IT.

Mr. Editor,—As a good deal has been said relative to the quantity of butter exhibited some short time since, by Mr. Kenworthy, made from one week's milking of a single cow, I was curious to ascertain the facts, as well with regard to her *keep* as the produce. I accordingly inquired in the proper quarter, and was informed that the cow Filton, now about seven years old, was purchased of John Zane, of this county, with her dam, both for thirty-eight dollars. Filton, at the time of her purchase, was four months old. This is all the information I have been able to obtain. Mr. Kenworthy informed me that her keep was as follows: a small quantity of hay in the morning, then a mess of bran, while eating which she was milked, then about half a peck of grains, well mixed with a suitable portion of cut stuff, with the addition of a little salt. She was then *well curried*, then watered, and especial care taken that she did not drink too much. If the weather was favorable, she was permitted to run in the barn yard, if not, she was stabled again, and fed with hay only. At noon and night she was treated in the same way, as above described, in every particular, except that the grains were omitted at noon. Milked morning and evening, the quantity of milk varying from *twenty-two to twenty-eight quarts* per day. The following is the produce of butter from the two weeks' milking:

First week's butter - - -	18 lbs.
Second week's - - - -	16½
	34½

Three pans of milk, belonging to the second

week's milking, were frozen, and thereby lost. The butter was very beautiful in appearance, and of a very superior quality, and we hope that many of our fair country-women will follow the example of Mrs. Kenworthy, who deserves no little credit for her care and attention to the duties of her dairy.

J. M——E.

From the New England Farmer.

BOUNTY ON SILK IN MASSACHUSETTS.

The Secretary of State, by the direction of the house, has laid before the legislature the amount paid in the form of bounties, since the act of 11th April, 1836.

The returns embrace the names and residence of the claimants; the number of pounds of cocoons raised; the number of pounds of silk reeled; the number of pounds thrown; and the amount of bounty granted in each instance.

The highest quantity of cocoons raised is 615 lbs., and of silk reeled is 52 lbs. 8 oz. We will give the names of a few of the principal growers of silk.

	Cocoons raised.	Silk reeled and thrown.
Ancory Holman, Bolton,	615 lbs.	52 lbs. 8 oz.
Benjamin Walker, Rehoboth,	277	
Timothy Smith, Amherst,	156	60
Reuben Hoar, Littleton,	159 8 oz.	
Jonas Holland, Belshertown,	182	
J. Bodman, Williamstown,	182	
Roswell Rice, Charlemont,	97 8	19
Joseph Field, do	76 8	16 4
Cyrus Smith, South Hadley,	70	
John Perry, Wales,	69	8

And several others, whose names may be ascertained by a reference to the secretary's report.

We subjoin the aggregate for the four years:—

Aggregate.

Year when the warrants were drawn.	Pounds of Cocoons.	Pounds of Silk reeled.	Pounds of Silk thrown.	Total amount of bounty allowed.
1836	613.2	36.10	11.2	$85 20
1837	1001.8	109.1	65.11	187 51
1838	1854.15	149.9	140.9	350 52
March 6, 1839	2631	190.6	79.8	397 99
	6100.9	525.10	296.14	$1021 22

Secretary's Office, March 14, 1839.

This great interest is just in its infancy. As we have always believed and said, it is destined to be one of the great interests of the country; but we must wait patiently until the mulberry speculation has ceased, or at least abated, before much progress can be made in the raising of silk. Of the decline of the disease there is at present little prospect. A sale of mulberry trees the last week, has gone far beyond any which have been made before. We shall venture no predictions, but calmly wait the event.

A SUCCESSFUL MODE OF KEEPING SWEET POTATOES.

To the Editor of the Farmers' Register.

I see in the last number of the Register, an article from a correspondent, in which he speaks of the difficulty of keeping sweet potatoes. I can give him the plan of a house, which has kept potatoes for the last five years. At the usual time for digging potatoes, the old ones were to be removed to give place to the new. This is a plan of the house: dig a square pit in the ground about four feet deep, about the size you wish your house to be; log it upon the inside until the logs are about four or five feet above the surface of the earth; ram the dirt well around the log frame in the earth. On the outside of the first frame, build another frame of logs, leaving a space of one foot between the two; fill the space between the frames with sand or dry earth; upon the top of the frames lay a plank floor, and the upper part of the floor to be covered with earth about 4 inches deep, then a roof with the gable end open to the south, and closed at the north. Have a door in the log frame about two feet square, to the south. After the potatoes are dug they must be protected from the sides and bottom by dry pine leaves. The door must be kept open in warm dry days, and closed in cold damp weather, and always at night.

P. S. Also a floor to the potatoe-house of poles.

A SUBSCRIBER.

From the Farmer and Gardener.

SUGAR BEET FOR MILCH COWS.

An intelligent gentleman from the eastward, assured us a few days ago, that by giving his cows a peck of sugar-beet twice a day, cut up with their hay, he was enabled to get just as rich milk and butter during the winter, as in summer, when the pasture was at its best. Now as an acre of ground well manured, planted, in this root well attended, would yield beets enough to keep *ten cows* from the 1st of November till the 1st of May, should not every farmer make his arrangements for planting beets next spring? From our own experience, we have no doubt, that this addition of beets to the ordinary feed of the cows, would make a weekly difference of 2 lbs. each in their product of butter. From the 1st of November to the 1st of May, there are 26 weeks. This number of weeks at 2 lbs. additional butter, would give us 52 lbs. for each cow during the period named, or 520 lbs. for the 10 cows, and if we set down the butter as being worth 25 cents per lb., it will give us 130 dolls. as the value of additional yield brought about by the feeding with the product of an acre in beets. But this is not all,—the proprietor of the cows, in the spring, would have the gratification to know that he had treated his animals well, and the satisfaction of seeing them in good condition.

From the Southern Agriculturist.

CERTIFICATE OF THE PRODUCE OF ONE ACRE OF CORN; WITH OBSERVATIONS, BY AGRICOLA.

The undersigned, a committee of the Agricultural Society of Liberty County, Georgia, do hereby certify, that on the 15th of September last, they measured carefully, by a sealed measure, the product of corn raised by Doctor Wm. P. McConnell, from one acre of *manured* ground, which yielded eighty-three bushels, three pecks,

and three quarts—for which, being the successful competitor, the society awarded him the premium of one hundred and fifty bushels of corn.

WM. J. WAY, E. W. RUSSEL. } *Committee.*

Walthourville, Oct. 27, 1838.

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Messrs. Editors,—I send you the above certificate, signed by a committee of the Agricultural Society of Liberty County, from which you will perceive that we have turned our attention to the cultivation of corn, an article too long neglected, or deemed only a secondary interest by many of our planting friends on the seaboard, from the circumstance no doubt of their efforts being mainly directed to the culture of cotton. This policy, however, we find has proven illusive, an *ignis fatuus* that has led many of our respectable planters (to say the least) into a most unpleasant dilemma, especially during the two past years, when corn could scarcely be procured at any price.

There were fifteen gentlemen enrolled as competitors for the prize, several of them having made from fifty to seventy-three bushels to the acre. So far as I know, eighty-three bushels of corn has never been made before from the acre of ground in the lower parts either of Georgia or South-Carolina. Dr. McConnell's plantation lies on tide-water, and he selected for the experiment a piece of high-land, cleared perhaps before the revolution, and of course much worn, but for the last five or six years had been planted in cotton, and highly manured.

The corn (yellow gourd-seed) was planted the 10th of March, on beds about fourteen inches in width, seven feet from the middle of one bed to that of the other, two rows on each bed a foot apart, the stalks also a foot apart on the rows, and set in a *zigzag* form. This left a clear alley of six feet, and gave 12,600 stalks to the acre. The corn was ploughed twice and kept clean with a hoe. I will remark, that about the middle of June, the beds were entirely covered with oak leaves, to obviate effects of a drought should it happen, but the rains the latter part of that month, and first week in July made the corn. This is our first effort, next year I hope we may be able to make a better report still of our success. Planters generally, in the lower countries, I trust, will soon see their real interest in this matter, and learn practically to depend upon themselves for the staff of life. In conclusion, I would mention that the society awarded to Mr. Wm. Dunham the premium of seventy-five dollars as the most successful competitor (out of fifteen) for having raised forty-six bushels and a half of corn on an acre of ground in its natural state.

AGRICOLA.

From the Genesee Farmer.

HAY-RACKS.

Hay-racks for feeding animals are best when placed in a vertical position, instead of inclining outwards, as in the former case, there is less liability of the hay being wasted, the heads of the animals will not become filled with hay-seed, and their breath will not ascend and render the hay offensive.

From the Southern Agriculturist.

POULTRY.

Mr. Editor,—It is much to be regretted that our market during the spring and summer months is so badly supplied with meats. Every where else these seasons are the best for the markets; but in Charleston, one can hardly get any thing palatable to eat.

This arises from our farmers not paying proper attention to their poultry. What is sent to market is so inferior as seldom to be fit to eat. What numbers of ducks, chickens, and turkeys might be raised for our market is beyond calculation. I have conversed with many of my neighbors, and they make complaints of the difficulty of raising these—but it appears to me that they mismanage in some way or other. Ducks, I scarcely ever fail to raise. The great secret in attending them, is to give them little water when young. These birds being aquatic in their natures, many persons will wonder at this. But such treatment invariably gives them colds; their wings soon begin to droop, and they die off in fits. My treatment of them I will here repeat to you, as given some years since.

Ducks, when just hatched, are always inclined to fever, from their pinion wings coming out too soon. This acts upon them as teething does on children. The young ducks should, consequently, be kept from every thing which may have a tendency to create cold in them. To prevent this, therefore, I always allow my young ducks as little water as possible. In fact, they should only have enough to allay their thirst, and should, on no account, be permitted to play in the water. If the person lives near the city, liver and lights should be procured; and these should be boiled and chopped up fine, and given to the young ducks. Or, if fish, crabs, oysters, or clams, can be procured, these should be given. In case none of these can be got, all the victuals should be boiled before feeding. Boiled potatoes mixed with hominy are also excellent. Half of the ducks which are lost, are, because raw food is given them. To sum up all in a word—if you wish to raise almost every duck that is hatched, give them little water, and feed them on no food which is not boiled. By observing this plan, I raise for market, and for my own table, between two and three hundred ducks every year.

Turkeys are also found difficult to raise with most persons. The following treatment will be found excellent: When the eggs hatch out, let the hen and chicks be confined in a garden, or any other place where the young ones can sun themselves. Let them be fed with hominy for two or three days; then carry them to a rail-pen, in a rye, oats, or buck-wheat patch; confine the hen, and feed at least three times a day with hominy or small grain. The young ones will soon run about catching insects, and will come to the hen's call. The hen should be thus confined until the turkeys are about *half-grown;* they will range about, but never without the sound of the mother's call. By this plan, we do away with the necessity of having a turkey-minder. The young ones are not so liable to injury from hawks or vermin as when they follow the hen in her rambles over the plantation, nor are they compelled, in keeping up with the hen, to fatigue themselves more than is good for health.

Great care must be taken to keep water out of the pen; it should be ditched all around, so as to keep it dry; its foundation should be made higher, with dry sand, than the level around, and the top should be well covered; the ditches nigh the pen should be covered with boards, to keep the young ones from falling in. You may rely on this plan, Mr. Editor. I have seen out of eighty-seven turkeys, eighty-six raised,—one having been mashed by a horse.

From the Southern Agriculturist.

CULTIVATION OF WATER-MELONS.

This delicious melon may be cultivated for an early market in the following manner:

Select a high and dry soil for the purpose. Plough it up well, and harrow it. Check off the spot thus treated at distances of ten feet each way. Dig out each check with a hoe or spade, and into the same place five or six quarts of cotton seed; or if this cannot be procured, fill the same with stable manure, partly decomposed. Haul over this the earth before dug from the hole, and mix it well with the manure. If you have used cotton seed, in the spring, it will have sprouted a week or two after being put into the hole; and must now be killed by chopping up the same well, and mixing it with the soil. This being done, you may now haul up the manure and earth as before directed, into hills; on the top of which you must place about a peck of sand taken from some street or well travelled road. Your hills will be now ready for planting. I should however, state that the hills must, instead of being made high, be made flat and broad.

Soak your seed over night in milk warm water, and plant out the same the next morning, placing from five to six seed to each hill. The seed must not be covered more than one inch or two under ground. Water the hills for a few days until the seed has sprouted, and then leave the plants to run.

As soon as the plant has got six leaves, take off the centre plant with a sharp penknife, and when the lateral shoots are six inches or a foot long, take off all but three. When the shoots, thus left, begin to run to the ground between the hills, stake them down with a small cross stick.

As the vines begin to branch, at every three or four feet, where the vine branches, put a shovel full of rich earth over the same, and press it down lightly with the foot. Wet weather should be selected for this operation, and by so doing the vines will never fail to take where they have been set. The spaces between the hills should be kept free of grass--and by following the above directions, large and fine melons will be produced.

From a quarter acre of land thus treated, more melons will be made than from four times the amount as usually cultivated.

From the Journal of the American Silk Society.

MEMORANDA FOR YOUNG SILK CULTURISTS.

Let silk cultivators bear in mind, that the careful and attentive manager of silk-worms, will make his worms spin cocoons in four weeks; eight pounds of his cocoons will make a pound of raw silk, and a pound and a quarter of his raw silk will make a pound of finished sewing or other silk. The careless manager will require at least six weeks before his worms spin their cocoons, ten pounds at least of his cocoons will be required to make a pound of raw silk; and at least a pound and six ounces of his raw silk will be required to make a pound of finished sewing silk. Let the rules of arithmetic be applied to find how well the silk business will pay for care and attention!

G. B. S.

From Loudon's Gardener's Magazine.

ON THE CULTIVATION OF MADIA SATIVA, AS AN OIL PLANT.

By W. Hertz, Nurseryman and Seedsman, Stuttgard.

M. Bosch, superintendent of the gardens of the king of Wirtemburg, has made numerous experiments for many years on acclimatising exotic plants, during the course of which one plant, *Madia sativa*, attracted peculiar attention, as he found from the reports of travellers in Chile, that it is cultivated in that country as an oleiferous plant, and an excellent oil is extracted from it. During the last few years, M. Bosch has given this plant a fair trial on a large scale, at considerable expense; and the results of this trial have surpassed his most sanguine expectations.

The plant is an annual belonging to the natural order *compositæ*, attaining the heigth of from 1½ ft. to 2 ft.; it agrees with every rotation of crops, and succeeds in all soils, provided they are neither too humid nor too stiff and binding; but, in a rich soil, if the necessary space be given to the plant to spread out its branches, it attains the highest perfection. The proper season for sowing is either in October, or the spring, and the necessary quantity of seeds required for an acre depends upon the condition of the soil, and varies from 4 lb. to 6 lb.; but it is, of course, advisable to sow a little more than is actually wanted, to provide against any unforeseen accidents which may happen to the seeds before germination. The young plants are not damaged by spring frosts; nor are they liable to be attacked by animals or insects. If spring sowing be preferred, the ground must be well prepared in the autumn, in order to sow the seeds as early in the spring as possible; after which they must be pressed down by rolling, and will need no other culture than to be kept free from weeds. When the seeds begin to ripen, which may be easily known by the change of their color from green to black, the plants are either cut off near the ground, or pulled up by the roots, and laid on the ground for drying; after which they are treated like rape. The seeds however, must not remain long before they are thrashed out; because the glutinous stalks, when heaped up, soon begin to ferment, and will do the greatest damage to the seeds.

The produce of one Wirtemburg acre, containing 38,400 square feet, amounts, according to the nature of the soil and the condition of the plants, to from 4 to 6½ scheffel (bushels) of seed. One scheffel weighs from 194 lb. to 208 lb.; and from that quantity from 68 lb. to 70 lb. of oil have been obtained, according to the trials that were made in several mills of different constructions.

According to a chemical analysis, 100 parts of the Madia oil consist of 45 parts of oleine (or fluid part of the oil), 40 of stearine (the mucilage, or fatty part), and 15 of glycerine (or sweet solid part, a honey-like and glutinous substance). This oil does not congeal at below 19° Reaumur, but only becomes a little less fluid, which makes it an incomparable substance for keeping all sorts of machines in order; and there can likewise be a solid and well lathering soap made of it. That it may be advantageously used in cloth manufactories has been proved by experiments already made, by which it was found preferable to the olive oil, which had been previously used. The produce of this annual oil-plant, if compared with that of the rape and the poppy, leads to the following conclusions:

The rape, which attains its perfection only in the second year, produces from 4 to 5 scheffel of seed per acre, and but seldom succeeds well. One scheffel of rape-seed gives 96 lb. of oil; therefore, one acre, in the space of two years, produces 480 lb. of oil, which makes for one year 240 lb.

One acre sown with poppies gives from 2¼ to 3 scheffel of seed; from one of which are obtained 88 lb. of oil, which gives a produce of 264 lb. per acre yearly.

One acre cultivated with *Madia sativa*, which ripens generally towards the end of July, produces from 4 to 6½ scheffel of seed. One scheffel gives 68 lb. of oil, therefore 6½ scheffel make a produce of 442 lb. of oil.

For all these reasons, it is to be hoped that the *Madia sativa* will soon take that place in our agriculture, to which, by its usefulness, it is justly entitled; and which, also, our sovereign (the king of Witemburg) has already acknowledged, by rewarding with a gold medal the merit of M. Bosch, in introducing a plant into field-culture which promises to become uncommonly useful, not only to our agriculture, but to our manufactures and trades. To make this important article as general as possible, I have a quantity of its seed for sale; and, for the convenience of the English agriculturist, I have made an offer to Mr. Charlwood to undertake the sale of it in England.

Stuttgard, Dec. 30, 1838.

From Young's Agricultural Travels in France.

FISH-PONDS IN FRANCE.

Sologne.—This province abounds very much with ponds of all sizes, which let at from 5 *liv.* to 12 *liv.* the arpent.

Bourbonnois.—Moulins.—Through every part of this province, which I saw in crossing it in two directions, the number of fish-ponds is very considerable. The country, though in extensive views flat to the eye, is, on a nearer examination, found to swell into a variety of gentle inequalities, which form valleys, with small brooks, springs, or streams, in them, as eligible for a residence, and agreeable to the eye, as it would be beneficial to cultivation, if they knew how to apply them. Mounds are made across these little vales, to form ponds; and there are mills at their heads, when the streams are considerable enough. These ponds are from two or three to ten, twenty, and thirty acres, and some a great deal more. They are all fished regularly every second or third year, and the fish sold, at so much a thousand, to the merchants, who send them, by the Allier, Loire, canal of Briare, and Seine, to Paris. On one estate, I saw eight ponds, that paid 800 *liv.*; on another, four paid 800 *liv.*; and, on a farm of about 400 acres, four ponds paid 1000 *liv.* Water deceives one so much in guessing the superficies, that I may be erroneous (for nothing is measured in this province); but I should guess, that land under water paid 20 *liv.* an acre at least, instead of 3 *liv.* which is the more common net produce of the country; and, at the same time that the proprietor receives this superior benefit, his table is, by the terms of the contract with the merchant, who stocks the ponds himself, allowed to be amply supplied.

Bresse.—The ponds of this little province and Dombes, cover 66 leagues square of country, and are found terrible to population, from the effect they have on the climate.* In 1764, ponds in France generally let at 5 *liv.* to 7 *liv.* per arpent.†

The management of ponds is vastly better understood in France than it is in England, both as to stocking, adapting the sort of fish to the soil, clearing the ponds, emptying, fishing, &c. &c. In all catholic countries, fish is of more importance than in protestant ones, and this occasions more attention being paid to them.

From Notes on the Agriculture of Lombardy.

EXAMPLE OF THE HOARDING SYSTEM, SUBSTITUTED FOR THE BORROWING SYSTEM OF GOVERNMENTS.

In an age in which the sovereigns of Europe are incumbered, and some of them ruined, by debts, a contrary conduct deserves considerable attention. The Duke of Modena, for ten years past, has practised a very wise economy: he is supposed, on good authority, to have saved about a million of *zecchins*, (475,000l.) and he continues to save in the same proportion. This is a very singular circumstance, and the effect of it is observable; for I was assured at Modena, that this treasure was much greater than the whole circulating currency of the duchy; and they spoke of it as a very mischievous thing, to withdraw from circulation and *use*, so considerable a sum, occasioning prices generally to rise, and every thing to be dear. By repeated inquiries, I found this dearness was nothing more than what is found in the states around, which have all experienced, more or less, a considerable rise of prices in ten years. But how could withdrawing money from circulation raise prices? It ought, on the contrary, in a country that has no paper-money, to lower them. That this effect did not follow, we may easily conclude, from these complaints. But the very persons who complained of this treasure could not assert that money was more wanted in the duchy than before it was begun to be saved. They even gave a proof to the contrary, by affirming the rate of interest to be at present 4½ per cent. only. Upon the whole, the effect is evidently harmless; and it is a most curious fact in politics,

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* *Observ. sur L'Agricult. par Mons. Varenne de Fenille*, p. 270.

† *Chanvalon Manuel des Champs.* 12mo. P. 363.

that a government can gradually draw from circulation a sum that in ten years exceeded the current coin of the state, without causing an apparent deficiency in the currency, or any inconveniency whatever. Conclusions of infinite importance are to be drawn from such a fact; it seems to prove, that the general modern policy of contracting public debts, is absurd and ruinous in the extreme; as saving, in the time of peace, is clearly without any of those inconveniences which were once supposed to attend it; and by means of forming a treasure, a nation doubles her nominal wealth, that sort of wealth, which is real or imaginary, according to the use that is made of it. The reputation, preventing attacks, is perhaps the greatest of all. How contrary to the funding system, which carries in its nature, such a probability of present weakness, and such a certainty of future ruin!

From Young's Agricultural Tour in Spain.

IRRIGATION IN SPAIN.

The prospects down the vale of Aran beautiful; it is without fallows, fine hemp instead of them. Look down on the town of Esteredano, around which, culture rises pretty high up the mountains. All the corn cut, is reaped, and bound in sheaves—walnuts. Descend into the vale—figs. Watered meadows. Ray-grass predominates; much common clover, white clover, trefoil, vetches, &c. A causeway for irrigation across the vale; the meadows are uncut, and have two and a half tons per acre, on an average; the corn all through, three-quarters an acre. Pass a rich flat common; part of this vale fed by horses, mules, hogs, asses, and a few oxen.

Advancing—what meadows there are, are well watered; as are French beans, hemp, and a small quantity of lucerne.

Leave Poeblar; they have lucerne, but not good; the gardens are all watered; mulberries; prices of silk this year, 18 *liv.* the pound. Cultivation all around, among the olive trees; but it is corn one year, and fallow another. Cross the river, which is here sixty yards wide. Wheels for raising the water of it into the gardens, ten or twelve feet high; they are of a very simple construction; something like the common water-wheels of a mill, but made very light; the fellies of the wheel are hollow in divisions, taking the water in through holes at equal distances, and as the stream turns the wheel, it delivers the water out of the same holes at the top of its revolution, into a trough, which conducts it where wanted; it is cheap, simple, and effectual. Many peach-trees scattered about the gardens, &c. Mount the hills; pass two large tracts, of above one hundred acres, destroyed by the torrents. Great quantity of pudding-stones. The mountains around are of interesting and bold features. The country in general here has a great mixture of cultivation and waste; it is for some space pleasing enough to the eye, but the produce is, I believe, very low; we saw many oats, and scarcely any that will produce more than a quarter an acre. They have no meadows; and I should observe, that our mules have not found such a thing as hay; straw and barley are their food; in all those spots which would give grass, corn and legumes are sown, as more necessary and more valuable; and this, I am told, is the case over all Spain, lucerne excepted.

Near Monte Schia—they have here poor crops of flat barley: of water, they know well the value, a spring of any account being carefully conducted into a reservoir, and let out at seven in the morning and at night to water.

Advancing—there is some good hemp, watered; and I see enough of the country to find that water is all in all; where that is to be conducted, they get crops that pay well; but where no water, they have not the power or the knowledge to turn the soil, however good it may be, to a profitable account; fallow the only effort, and the success every where miserable.

Cross a fine stream with many acres under it, yet no watering; the reason I cannot tell, unless the land is common; if so, it is easily explained.

The soil stoney; the large, of the pudding class; but, in the midst of this arid wretched desert, come to a spring, which rises out of the earth into a small reservoir, and is immediately used for irrigation; maize, hemp, cabbages, beans, and all fine; the contrast shows the astonishing effect of water, and that in this climate, the soil is the least object—the sun and water do the whole.

Passing Paous; every thing changes the features; the vale, on comparison with those we have seen, is wide, and also flat, and water plentifully conducted in canals, which pass every quarter, so as to let into the field of every proprietor; having passed above one hundred miles of dreary mountain, this vale, so great was the contrast, had the appearance of enchantment; the care and attention given to irrigation, cannot be exceeded. The land is prepared for it, by levelling with a nicety as curious as for making a bowling-green, and this (conducting the water excepted, which is common to every one), is the only expense: this general level is divided into oblong beds, from six to eight feet wide, by little ridges of fine mould, drawn up nicely with a rake every time the ground is sown, in order that the water may not spread over too much at once, in which case, the irrigation would be unequal; there would be too much of a current at the part where the water enters, a circumstance of no great importance in watering grass-land, but which would be mischievous in arable; small trenches take the water from the carrier canals, and passing by the ends of those beds, the farmer opens them at pleasure, to distribute the water where wanted. As soon as the land is sown, it is watered, and periodically, till the plants are up; moderately while they are young; but every day, and sometimes twice a day, when full grown: the effect is surprising, and infinitely exceeds that of the very richest manures that can be spread upon any land. The rapidity of vegetation is so great, that there are but few crops, which demand all the summer for coming to perfection; I believe hemp is the only one; that plant is now five to seven feet in height, and of so thick a luxuriance, that nothing can be imagined finer. The rye stubbles are ploughed and sown with French beans, which are up and watered. After hemp, wheat is the crop.

Watered maize here, seven to nine feet high. Every time we see any irrigation, we are struck more and more with the importance of water, even on soils which are apparently mere rock, and on

the most arid deserts, it gives at once the utmost luxuriance of vegetation. Vines and olives, however, stand in no need of it, but thrive admirably on the driest soils without it: not one acre, however, in twenty, is planted with them that might be.

Come to more watered grounds; gardening and husbandry mixed; peaches; apples; ripe pears; pomegranates in the hedges, as large now as walnuts in the shell; onions and lettuces in great plenty. Some watered lands have been sold at 1300 *liv.* the journal.

Near Martorelle is a fine irrigated valley; French beans, seven feet high. Good lucerne, cut three or four times a year; onions, cabbages, and lettuces; but the hemp, every where a principal crop, not great. The land all formed into beds for watering, which I have already described.

Exceeding fine hemp, watered. Maize thick, and in ear. Many fine and tall poplars by the river.

They are now (July) ploughing their stubbles for French beans. Their course is,

1. Hemp.

2. Wheat; and after wheat, French beans. Three crops are therefore gained in two years. The products good. Very fine mulberries. A journal, which is here also about an English acre, of rich land in the vale, not watered, sells for 500 *liv.*: watered, for 1000 *liv.*

Leaving Barcelona, enter immediately an extraordinary scene of watered cultivation, and which must have given the general reputation to the province. Nothing can well be finer. The crops in perpetual succession—and the attention given to their culture great. Not the idea of a fallow; but the moment one crop is off, some other immediately sown. A great deal of lucerne, which is cut four, five, six, and even seven times in a year; all broadcast, and exceedingly thick and fine, from two and a half to three feet high, when cut. It is all watered every eight days. We meet many mule-loads of it going into the town, each 450 lb. or 4½ quintals, which sells for 4 *pefettos*, or near 4*s.* English; suppose it 4*s.* for 500 lb. it will not be difficult to calculate the produce of an acre. All I saw would yield 10 tons, green, per acre, at each cutting, and much of it a great deal more; let us suppose five cuttings, or 50 tons per acre, at 16*s.* a ton, this is 40*l.* sterling per acre. It is to be remembered, that the growth we saw, was the third, perhaps the fourth, and that the first and second are in all probability more considerable, it will not, therefore, be thought any exaggeration to calculate on five such. I by no means assert that lucerne yields always, or generally so, as I speak only of what I see. I have very little doubt, however, but this is the amount of that portion, which is thus cut and sold to Barcelona; possibly one-third, certainly one-fourth, is to be deducted for the expense of carriage; this is the most difficult part of the calculation, for it depends on how many times the mule goes in a day, which must also depend on the readiness of sale, and other circumstances. The profit is, however, amazingly great. All the other lucerne I have any where seen sinks, in my idea, to nothing, on comparison with the vast and luxuriant burthens given by these watered grounds. The finest crops I have known in England, are drilled; but there is a fallacy to the eye in the drilled crops, in proportion to the distance of the rows; they appear thick while they are really thin, but in broadcast ones, which satisfy the eye, there is no deception; and these immense burthens, through which the scythe is with difficulty moved, produce more at one cutting, than two-feet drills would at three, with the advantage of the herbage being finer and softer. But weeds in England and Catalonia are two very different things; it well deserves, however, with us, a better trial than it has yet generally received; I have viewed broadcast crops; particularly Rocque's, on a very rich garden soil; and Dr. Tanner's, on a common turnip loam, which, though not to be named with the Spanish, were certainly encouraging.

Hemp, through all these watered lands, is the predominant crop; it is seven feet high, and perfectly fine; some of it is already harvested. I am sorry to see that the watered part of the vale is not more than a mile broad. Indian fig, called here, *figua de maura*, grows six or seven feet high, very branching and crooked, the arms at bottom as thick as the thigh of a common man; those and many aloes in the hedges. Every garden or farm has a small house, with a reservoir for water, which is filled in most by a water wheel, with jars around the circumference. The gardens between Barcelona and the fort, and also within the walls, are watered in the same manner; the water is let into every little bed, in the same way as I have already described. They are crowded with crops, and kept in most beautiful order; those in and close to the town, scattered with mulberry trees. But in the district of which I am speaking at present, among the hemp and lucerne, neither vine, olive, nor mulberry. These watered lands belong generally to proprietors who live in Barcelona, and are let at 30 to 40 Spanish *livres* the journal.

The valley, in its widest part, is three miles broad. Here it lets at 34 Spanish *livres* a year the journal, and sells from 600 *liv.* to 1000 *liv.*; each of these *livres* being about 54*s.*: (1000 Spanish *livres* makes 2700 French ones). Taking the medium, or 800 *liv.* and the French *livre* at 10½*d.*, this makes the price of a journal 90*l.* 2*s.* 6*d.*; and the rent of it 4*l.* The gross rent of the land, therefore, pays nearly 4½ per cent.; but whether this is clear rent, the tenant paying all taxes, and doing the small repairs of his house, &c., or whether there are deductions on these accounts, are questions which were neither forgotten nor resolved. To show the quick succession of their crops, they have corn in stooks on the borders of some of the fields, and the land ploughed and sown with millet, which is already nine inches high. Many bleaching grounds.

Advancing—the irrigated land lets from 24 to 40 Spanish *livres*: that not irrigated, at 15 *liv.* Water, therefore, here more than doubles the rent of the land; and in other places, we have found the difference yet greater. The soil all the way a red and brown deep friable loam, with a sufficient adhesion for any crops. They sow French beans after hemp, and then sow wheat.

At Ballalo, two hours from Barcelona, we meet with the first vineyards, but the hills here come down to the sea; and where they do not, the vale is not more than half a mile wide. Lycium in the hedges; some few mulberry trees. Oranges

in the gardens; a few palm-trees, with vines around them.

A journal of watered hemp, produces from 10 to 12 quintals; if not watered, the product much inferior; the price, 14 to 17 Spanish *livres* the quintal, or 35*s*. English, which makes 19*l*. 5*s*. an acre. This is, however, to be understood of a very fine acre. The mountains are at half a mile distant, and partly cultivated to the top. All the way inclosed, and the men mending gaps in their hedges.

Every scrap of flat land well watered, from wells and reservoirs; the hill covered with vines.

Land, near Canet, well watered, sells for 500 Spanish *livres* the journal; vineyards for 300 *liv.* They give, in good years, to 12 charges. Unwatered land, 100 to 150 *liv.*

Enter a flat vale, half a mile broad, not watered. Hemp, very poor; maize, seven feet high. Vineyards, under regular plantations of olives; corn cut, in stooks, and the land ploughed. A journal sells for 200 *liv.* and further on, where irrigated, for 1000 *liv.* which is an astonishing difference.

While the mountains and waste parts of the province present an unfavorable prospect, the watered districts are, on the contrary, scenes of most exuberant fertility. To a person, from the north of Europe, there can hardly be a more striking spectacle than the effect of watering in these southern climates; it converts an arid stony waste, which would yield nothing but vines and olives, and on which every sort of grain would hardly return the seed, at once into fields pregnant with the richest harvests; on such soils, it gives almost the whole value of the land; and on the richest, it raises it, at the least, double; and, in some instances, five times. It enables the cultivator to have a succession of crops, more important than any thing we know in the north. The reaping one crop is but the signal for immediately putting in another; in doing which, they exert themselves with the utmost activity; ploughing universally as soon as the corn is cut; and are, by this means, enabled to have constantly two crops a year. The extreme fertility of these lands has, however, led many travellers into great or ignorant exaggerations; they have asserted, that the land yields many crops at the same time, one under another, which is both true and false. It is fact, that corn, wine, oil, and silk, are produced by the same field, in some few instances; but it is not from hence to be concluded, that the goodness of the land, or the importance of irrigation, is at all shown by that circumstance. The fact is, that it is impossible to raise one crop under another, without losing in one nearly as much as you gain in the other; the olive, being a large tree, cultivation may be carried on under it, but the crop gained is poor, and shows, that exactly in proportion to the shade is the injury sustained by the produce which is shaded. If the trees are thick, the corn is hardly worth reaping; it is the same in other cases, and I was well convinced, from viewing their grounds with this design, that the soil can carry, profitably, but one crop at a time; several may be crowded on it, but nothing is gained; with grass under trees, this is not the case so much in a hot climate; but even grass is damaged, and it is not the question, at present, as they have none. A country to be supported, and in a hot climate, without meadows or pastures, sounds very strange to English ears, and it is among the curious circumstances of this part, and I am told of the rest of Spain. If they applied to grass the land that is proper for it, they could not possibly have bread to eat; straw here is given instead of hay, and entirely supplies its place; and the oxen and mules, which we saw, did not show in the least, by their looks, any deficiency in nourishment. Lucerne is not at all common through the interior part of the province, and where they cultivate it, it is used green. Maize is sometimes sown merely for its herbage, as it might be, I believe, profitably in England, late in the spring, to avoid our frosts; it is one of the most nourishing plants in the world.

The consequence of water being so apparent in the province, I could not but attend particularly to their exertions in conducting it, and I concluded, that not one acre in twenty, perhaps in forty, is watered, that might be. In the flat vales, where canals of irrigation are made, at a small expense, a very good, though by no means a complete, use is made of them; but on the declivities of the mountains, it is necessary to erect a mound of solid masonry across the river, and to cut the canal partly out of rocks, and to support it by walls of stone, as I have seen in France; and having thus diverted a large portion of the water of a river, to carry it on its level, along the side of the mountain, as far as it will go; such exertions demand a much greater capital, than is to be found upon the lands of Catalonia: it could be done only by a great lord, who knew the importance of such undertakings, who resided on his estate, and whose income was spent in something else than the taste and pleasures of a capital. But leaving such exertions to individuals, who either have not the money, or not the will to employ it, is to perpetuate wastes. It is the king only who can make those efforts; a monarch, who should be determined to improve his kingdom, would presently find the means of doing it. The importance of water is so well known, that if a canal is made to conduct it, the proprietors, or farmers of the lands below, would readily and speedily make use of it, paying proportionably for the quantity they took; this is the system in Lombardy, and the effect is great. It would be the same in Catalonia, but the capital, for the great work of the canal, must probably be supplied by the king, if not the whole, at least a considerable portion. Such money should be lent to undertakers, at a moderate interest. Exertions of such a nature, with a proper general attention given to these objects, would make them fashionable among the great lords of the kingdom, and fertile provinces would soon be created out of barren and desolate wastes. Arbitrary power has been exerted for ages, in efforts of barbarity, ignorance, and tyranny; it is time to see it employed in works that have the good of mankind for their aim. A beginning, and a very good one, is made in the construction of some great roads, on a scale of true magnificence, which is never exhibited with such effect as in works of public utility; and whenever the importance of cultivation is well understood in Spain, and the right means of advancing it clearly analyzed, irrigation will then receive an attention that has not, hitherto, been given. Such is the necessity of water, for various productions in this

climate, that rivers ought to be no more than infinitely multiplied channels, and collected in one stream only, as a reservoir for fresh, and repeated deviations.

For the Farmers' Register.

THE COUNTY OF FLUVANNA.

We have experienced in this region quite a hard winter, though very little snow has fallen. Nevertheless, I think, with exception of late sowing, in consequence of a continued wet season, our wheat generally promises well. Two very severe frosts within this month caused considerable apprehension for the fate of young clover, tobacco plants, and fruit, but they all passed unscathed. The two first are hard to be killed, and fruit was luckily too backward to be much endangered. Those who had planted morus multicaulis have entertained fears for its safety, but I fancy, without grounds. ——————— brilliant success in that culture, together with the inestimable testimonials of its profits, as set forth in yours and most of the journals of the time, have infected our neighborhood with the *rage;* and a respectable company has been organized for the propagation of the tree, (of which I am an humble member,) under the style and title of the "Palmyra morus multicaulis company." I fear the fever has seized on us rather *late in the day*, as well as season, both for the chance of great profit, as of success in the plantation, as the cuttings for our experiment are yet to be planted. But a suitable piece of ground having been laid out and well prepared, under the superintendance of our zealous and industrious president, Dr. Blakey, a resident of Palmyra, we have much to hope. By the way, as you have doubtless partaken of the false impression common to the country in which we both live—and indeed hardly confined to it—that *Fluvanna* is another term for sterility of soil, poverty of purse, and all that is barbarous in arts and taste—let me tell you, that Palmyra, the metropolis of the county, is a handsome and flourishing little village, situated on elevated, but rather broken ground, for convenience; overlooking the Rivanna, over which there is a handsome and substantial covered bridge, just below which are mills of various kinds; among them a large manufactory of flour, with another of wool, and one of plaster attached; not forgetting saw-mills, and last, though not least by any means, a new establishment with all the necessary apparatus, (in view on a creek within half a mile,) for crushing *gold* ore, of which there is a quantity at the door awaiting the separation of the *precious metal* from the baser ore which envelopses it. "Prodigious!" you will say. But this is not all—Palmyra is adorned by one of the handsomest and most commodious court-houses in the state, with tasty offices appertaining; a large tavern and dwelling house convenient, of brick; besides store houses and shops of every kind, whose tenants are mechanics of higher qualifications and character than are usually to be found in a village. The dwelling houses of the inhabitants that are not of brick, are well built frame houses, painted white, which give an air of variety and neatness to the village; and as if to "lend enchantment to the view," the far extended chain of Southwest Mountains presents itself to the eye, and beyond it in the distance, the more grand and lofty Blue Ridge. To crown all—this flourishing little place has sprung into renewed existance under the auspices and late proprietorship of the Messrs. A. & A. Shepherd, to whose enterprise, intelligence and highly estimable characters, the community around is deeply indebted. As to the fertility of the county—whose ill name has been given it by travellers over its barren ridge roads—it is only necessary to call your attention to its geography, in reference particularly to the extent of it through which the James and Rivanna rivers, and their innumerable tributary creeks, pass. Go to the manufacturers of tobacco in Richmond and ask them what county in the state affords the highest priced and best tobacco, and *most of it* too? They will tell you Fluvanna. But my dear sir, you must come among us to see and acknowledge the injustice of aspersions which have for an age rested on the hitherto despised "state of Fluvanna."

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From Anderson's Essays.

ON THE MANAGEMENT OF THE DAIRY, PARTICULARLY WITH RESPECT TO THE MAKING AND CURING OF BUTTER.

By Dr. James Anderson.

When a dairy is established, the undertaker may sometimes think it his interest to obtain the greatest possible *quantity* of produce; sometimes it may be more beneficial for him to have it of the *finest quality*, and at other times it may be necessary to have both these objects in view, the one or the other in greater or less proportion; it is therefore of importance that he should know how he may accomplish the one or the other of these purposes, in the easiest and most direct manner.

To be able to convert his milk to the highest possible profit in every case, he ought to be fully acquainted with every circumstance respecting the manufacture both of butter and of cheese; as it may in some cases happen that a certain portion of that milk may be more advantageously converted into butter than into cheese, while another portion of it would return more profit if made into cheese. It is not, however, intended in the present essay to enter into this wide discussion. Here, it is only proposed to treat of the manufacture of butter, leaving the subject of cheese-making to some other person to treat of, who is more conversant in that department than the author of this essay.

The first thing to be adverted to in an undertaking of this nature is, to choose cows of a proper sort. Among this class of animals, it is found by experience, that some kinds give milk of a much thicker consistence, and richer quality, than others; nor is this richness of *quality* necessarily connected with the smallness of the *quantity* yielded by cows of nearly an equal size; it therefore behoves the owner of a dairy to be particularly attentive to this circumstance. In judging of the value of a cow, it ought rather to be the quantity than the quality of the *cream* produced from the milk of a cow in a given time, than the quantity of the milk itself. This is a circumstance that will be shown in the future to be of more importance than is generally imagined. The small cows of the Alder-

ney breed afford the richest milk hitherto known; but individual cows in every country may be found, by a careful selection, that afford much thicker milk than others; these, therefore, ought to be searched for with care, and their breed reared with attention, as being peculiarly valuable.

Few persons who have had any experience at all in the dairy way, can be ignorant, however, that in comparing the milk of two cows, to judge of their respective qualities, particular attention must be paid to the time that has elapsed since their calving; for the milk of the same cow is always thinner soon after calving, than it is afterwards; as it gradually becomes thicker, though generally less in quantity, in proportion to the time the cow has calved. The color of the milk, however, soon after calving, is richer than it afterwards becomes; but this, especially for the first two weeks, is a faulty color, that ought not to be coveted.

To make the cows give abundance of milk, and of a good quality, they must at all times have plenty of food. Grass is the best food yet known for this purpose; and that kind of grass which springs up spontaneously on rich dry soils is the best of all.* If the temperature of the climate be such as to permit the cows to graze at ease throughout the day, they should be suffered to range on such pastures at freedom; but if the cows are so much incommoded by the heat as to be prevented from eating through the day, they ought, in that case, to be taken into the cool shades for protection, where, after allowing them a proper time to ruminate, they should be supplied with abundance of green food, fresh cut for the purpose, and given to them by hand frequently, in small quantities, fresh and clean, so as to induce them to eat it with pleasure.† When the heat of the day is over, and they can remain abroad with ease, they may be again turned into the pasture, where they should be allowed to range with freedom all night during the mild weather of summer.

Cows, if abundantly fed, should be milked three times a day during the whole of the summer season;* in the morning early, at noon, and in the evening, just before night-fall. In the choice of persons for milking the cows, great caution should be employed; for if that operation be not carefully and properly performed, not only the quantity of the produce of the dairy will be greatly diminished, but its quality also will be very much debased; for if all the milk be not thoroughly drawn from a cow when she is milked, that portion of milk which is left in the udder, seems to be gradually absorbed into the system, and nature generates no more than to supply the waste of what has been taken away. If this lessened quantity be not again thoroughly drawn off, it occasions a yet farther diminution of the quantity of milk generated; and so on it may be made to proceed in perpetual progression from little to less, till none at all is produced. In short, this is the practice in all cases followed, when it is meant to allow a cow's milk to dry up entirely without doing her hurt. In this manner, therefore, the profits of a dairy might be wonderfully diminished; so that it much behoves the owner of it to be extremely attentive to this circumstance, if he wishes to avoid ruin. It ought to be a rule without an exception, never to allow this important department to be entrusted, without control, to the management of hired servants.† Its importance will be still more manifest from what follows:

In the management of a dairy, the following peculiarities respecting milk ought to be very particularly adverted to; some of them are, no doubt, known in part to attentive housewives, but they never yet, I have reason to believe, have been adverted to as their importance deserves; and by many have never been thought of at all. I put them down in the form of aphorisms, that they may be more adverted to, and the easier retained.

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* So little attention has hitherto been bestowed on this subject, that I do not know of any regular set of experiments that have ever yet been made with a view to ascertain the effects of any of the natural grasses that spontaneously spring up in abundance on our fields, either on the *quantity* or the *quality* of the milk of cows, and few that have been attempted even with regard to those plants that have been cultivated by art, as green forage for them; though it be well known that some particular kinds of plants strongly affect the taste, and alter the quality of particular products of milk. It is, indeed, in all cases, confidently asserted, that old pastures alone can ever be made to afford rich butter or cheese. This, however, I know from my own repeated experience to be a popular error, as I have frequently seen much richer butter made by one person from cows that were fed in the house, chiefly with cut clover and rye-grass, than that which was made by others, where the cows were fed on very rich old pastures. Mankind are, in general, disposed to throw the blame of every failure upon some circumstance that does not reflect on themselves as bad managers. Hence it is, that the grass of a farm is often blamed for the want of richness of the butter produced upon it; when, if the circumstances were fully investigated, it would be found to be occasioned by the unskilfulness of the dairy-maid, or the want of attention in the choice of proper cows.

† In very warm climates, where the heat is extremely oppressive to cows, and the flies are exceedingly troublesome, sheds open on one side, the roof being only supported there by pillars, would not afford them such effectual shelter as they would require. In these cases, the sheds should be walled up on both sides, and be left open only at the two ends, which, if properly placed, would produce a continued stream of air throughout the whole building, that would prove highly salutary to the cattle.

* If cows be milked only twice in the day, (24 hours) while they have abundance of succulent food, they will yield a much smaller quantity of milk in the same time than if they be milked three times. Some attentive observers I have met with, think a cow in these circumstances will give nearly as much at *each time*, if milked three times, as if she were milked only twice. This fact, however, has not, that I know of, been ascertained by experiment. There can be no doubt but they give more, how much, is not ascertained; nor whether it would be advantageous in any case to milk them four times, or oftener; or what effect frequent milking produces on the *quality* of the milk.

† Cows should always be treated with great gentleness, and soothed by mild usage, especially when young and ticklish, or when the paps are tender; in which last case, the udder ought to be fomented with warm water before milking, and touched with the greatest gentleness, otherwise the cow will be in danger of contracting bad habits, becoming stubborn and unruly, and retaining her milk ever after. A cow never lets down her milk pleasantly to the person she dreads or dislikes. The udder and paps should always be washed with clean water before milking; but care should be taken that none of that water be admitted into the milking pail.

Aphorism I.

Of the milk that is drawn from any cow at one time, that which comes off at the first is always thinner, and of a much worse quality, than that which comes afterwards, and the richness goes on continually increasing to the very last drop that can be drawn from the udder at that time.

Few persons are ignorant that milk, which is taken from the cow last of all at milking, which in this country is called *strokings*, is richer than the rest of the milk; but fewer still are aware of the greatness of the disproportion between the quality of the first and the last drawn milk from the same cow at one milking. The following facts respecting this circumstance were ascertained by me many years ago, and have been confirmed by many subsequent experiments and observations.

Having taken several large tea-cups, exactly of the same size and shape, one of these tea-cups was filled at the beginning of the cow milking, and the others at regular intervals till the last, which was filled with the dregs of the strokings. These were each weighed, the weight of each cup being settled so as to ascertain that the quantity of milk in each was precisely the same; and from a great number of experiments, frequently repeated, with many different cows, the result was in all cases thus:

1. The quantity of cream obtained from the first drawn cup was, *in every case*, much smaller than from that which was last drawn; and those between afforded less or more, as they were nearer the beginning or the end. It is unnecessary here to specify these intermediate proportions; but it is proper that the reader should be informed that the quantity of cream obtained from the last drawn cup, from some cows, exceeded that from the first in the proportion of *sixteen* to *one*. In other cows, however, and in particular circumstances, the disproportion was not quite so great; but in no case did I find it fall short of the rate of *eight* to *one*. Probably, upon an average of a great many cows, it might be found to run at *ten* or *twelve* to *one*.

2. The difference in the *quality* of the cream, however, obtained from these two cups, was much greater than the difference in the *quantity*. In the first cup the cream was a thin tough film, thinner, and perhaps whiter, than the paper on which I write; in the last, the cream was of a thick *butyrous* consistence, and of a glowing richness of color, that no other kind of cream is ever found to possess.

3. The difference in the quality of the *milk* that remained after the cream was separated, was perhaps still greater than either in respect to the quantity or the quality of the cream. The milk in the first cup was a thin bluish liquid, like as if a very large proportion of water had been mixed with ordinary milk; that in the last cup was of a thick consistence and yellow color, more resembling cream than milk, both in taste and appearance.

From this important experiment it appears, that the person who, by bad milking of his cows, loses but half a pint of his milk, loses, in fact, about as much cream as would be afforded by six or eight pints at the beginning, and loses besides, that part of the cream which alone can give richness and high flavor to his butter. Many other useful corollaries may be drawn from it, which I do not at present stop to enumerate. Some of them will occur in the sequel.

Aphorism II.

If milk be put up in a dish and allowed to stand till it throws up cream, that portion of cream which rises first to the surface is richer in quality, and greater in quantity, than what rises in a second equal portion of time; and the cream that rises in the second interval of time is greater in quantity and richer in quality than that which rises in a third equal space of time; and that of the third than the fourth, and so on, the cream that rises decreases in quantity, and declines in quality continually as long as any rises to the surface.

My experiments not having been in this case made with so much accuracy as in the former, I have not been enabled to ascertain the difference in the proportion that takes place in equal proportions of time; but they have been so often repeated as not to leave any room to doubt the fact; and it will be allowed to be a fact of no small importance in the management of the dairy. It is not certain, however, but that a greater *quantity* of cream may upon the whole be obtained from the milk by taking it away at different times; but the process is so troublesome as not to be counter-balanced by the increased quantity obtained, if indeed an additional quantity be thus obtained, which is not as yet fully certain.

Aphorism III.

Thick milk always throws up a smaller proportion of the cream it actually contains to the surface, than milk that is thinner, but that cream is of a richer quality; and if water be added to that thick milk it will afford a considerably greater quantity of cream than it would have done if allowed to remain pure; but its quality is at the same time greatly debased.

This is a fact that every person attentive to a dairy must have remarked; but I have never heard of any experiment that could ascertain either the precise amount of the increased quantity of cream that might thus be obtained, or of the ratio in the decrease of its quality; but it ascertains the effects at least of mixing water with the milk in a dairy; and the knowledge of this fact will enable attentive persons to follow that practice which they think will best promote their own interest.

Aphorism IV.

Milk which is put into a bucket, or other proper vessel, and carried in it to any considerable distance, so as to be much agitated, and in part cooled, before it be put into the milk-pans to settle for cream, never throws up so much or as rich cream, as if the same milk had been put into the milk-pans directly after it was milked.

In this case it is believed the loss of cream will be nearly in proportion to the time that has elapsed, and the agitation it has sustained after being drawn from the cow. But I am not as yet in possession of any experiments that sufficiently ascertain how much is to be ascribed to the time, and the agitation, taken separately. On every branch of agriculture we find experiments wanting at each step we advance in our inquiries. The labors of no one man can complete the whole; but it is the duty of every inquirer to point out, as he goes along, where they are wanted.

From the Genesee Farmer.

FEEDING SHEEP.

To have sheep do well in our severe winters, they should not only have enough to eat, but it

should be given to them in such a manner that they may receive the full benefit of the food given. Daubenton and some other writers have calculated that two pounds of hay a day is sufficient for a sheep; but this is greatly depending on the manner in which they are fed. Sheep more than most animals require feeding often, and in small quantities. They should never be fed less than three times in a day, and if the same quantity of food is divided into still smaller portions, by more frequent feeding, it will be the better for the flock. Every farmer should remember that sheep are very unequal feeders, in cold days eating nearly double the quantity they will consume in a warm damp one, and the feeding should be regulated accordingly. If indeed on such a day, their food is, as is frequently the case, all given to them at a time, their breathing upon it, and trampling upon it, will render it nearly useless to them. But we do not imagine that two pounds of hay per day will keep a sheep in good condition for four or five months, or that a ton of hay will keep nine or ten sheep through the winter of our climate. They require something more; they long to get at the earth, and since that is impracticable, green food of some kind should be given them with their hay. A few cut turnips, potatoes, or carrots, salted occasionally, distributed daily among the flock, will greatly assist in keeping them in good flesh and heart. Farmers would escape much of the disease, as shedding of wool, loss of lambs, and general injury of their flocks consequent on poor keeping, by giving that attention to this truly valuable animal, which none better repays.

From the Franklin Farmer.

PREPARING WOODLAND FOR SOWING GRASS SEEDS.

Richland, Ky., March 18, 1839.

In the winter of 1836, (say February,) I had some 60 or 70 acres of woodland previously belted, and in the proper stage for seeding in grass, but owing to the wet season in the fall, I could not burn the leaves sufficiently to let the seed reach the ground; after trying a large harrow and a large brush, which proved ineffectual, I adopted the scraper, made by taking a slab or puncheon five feet long and two feet wide, inserting therein a common split ox tongue and attaching one yoke of oxen and a horse thereto. It answered the purpose beyond my expectation. It threw the leaves in piles and left the ground perfectly clean and smooth, ready for the reception of the seed; the ground had been fenced in the fall, the brush pick up and grubbed, the logs remaining, and the stock kept off, so that the freezing had rendered it quite light.

I put one hand to drive, one to manage the scraper, and one to sow the seed; they went over from seven to eight acres per day, jumping the logs with ease. I sowed two gallons of clean timothy seed and half bushel of blue grass seed (cut) per acre, and I believe it has as good a set as any meadow, save where the logs and leaves remain. I believe it to be the surest and best way that woodland can be seeded, having tried burning the leaves and other modes: but it takes the ground nearly or quite as long again to become as well seeded as the plan above. If the information is worth inserting in your valuable paper you can do so.

Yours resp'ly,
STEPHEN C. BROWN.

From the Farmer and Gardener.

ADVANTAGE OF HIGHLY CALCAREOUS SOILS FOR MULBERRY TREES AND GRAPE-VINES.

Hempstead C. H., Ark. March 1, 1839.

E. P. ROBERTS, Esq.—*Dear Sir:*—The silk interest, which absorbs so much public attention in the older and more enlightened portions of the union, has not yet elicited much attention among us. The Chinese mulberry, so far as I can learn, is not yet to be found in this state, except in my little nursery. There it thrives admirably. The young buds, in sheltered situations, are at this time expanding sufficiently to feed young worms; and last fall, though we had an early frost, fresh leaves were to be found as late as the 10th of November—thus giving more than eight months vegetation for the precious insect. The three original trees that I have, of three seasons growth, are twelve feet high, and eight inches in circumference at the root; those of two years are nearly equal, and the sprouts of last year's growth, from two year old roots, are from six to ten feet high, and from six to twelve sprouts from each root. I find, also, from trial, that a highly calcareous soil, like our prairie, is best adapted to the culture of this tree. Observing that the native morus rubra delighted in the skirts of the prairie, where the soil contains 50 per cent. of carbonate of lime, I planted last spring a few of the morus multicaulis in this kind of soil: they far surpassed in every respect those planted in the adjacent sandy loam, though well manured. The wood is more firm, shorter jointed, more branches, and the leaves thicker and darker colored; resembling in this respect, the difference between the cotton plant growing in the sandy land and that in the prairie—the former growing taller, but the latter a thicker stalk, and producing a greater number of limbs and bolls. With my present planting, which I have finished, I shall have this year something like 20,000 of these precious trees growing. Having the fullest confidence in the final success of the enterprise, I am encouraged to go on, though alone, in preparing for the introduction of the silk-culture, nor shall I be detained by scoffs or sneers.

The grape-vine, also succeeds well with me, though for the three first years, the first was mostly lost by the mildew, yet last year, those vines when I had made the soil artificially calcareous in a high degree, perfected their fruit, without this disaster. Those vines, when marl was not used, mildewed, and cast four-fifths of their fruit as usual. This experiment, which I was induced to make from a hint once thrown out by Mr. Hebermont, appears to have fully succeeded. The soil was originally a stiff red clay, and had been an old cow-pen; I gave it a dressing of an inch thick of marl from the prairie, containing 75 per cent. of carbonate of lime (rotten lime-stone.) These, however, were European vines, of four different varieties, all alike subject to mildew. The native vines of our own forests which I had

transferred to my garden, and cultivated, are sure and abundant bearers, not subject to any disease. I have planted this season a quantity of seeds of the European grape, in the hope that the vines, being actually native, may be better adapted to our climate. Should the experiment succeed, it will be a "consummation devoutly to be wished."

I cannot help considering the introduction of the silk-culture as forming a new era in agricultural enterprise, and calculated to be attended by the most important benefits to all classes of society. Could it be introduced here, in the elevated and healthy portion of our state, with the energy and intelligent enterprise with which it is impelled by New England ingenuity, with our many and great advantages of soil and climate, it would be the means of bringing vast tracts of land into cultivation that are now considered unfit for corn or cotton, from being broken and hilly, and subject to wash. This circumstance would be no objection to the cultivation of the mulberry, but rather an advantage; and besides, such lands are generally watered by the finest springs, which is seldom the case with the extensive alluvial plains that are usually selected for large cotton plantations. Unfortunately, our best cotton lands lie bordering on the rivers, that are skirted by extensive swamps, the first reclaiming of which is attended by an enormous sacrifice of human life, and none but the African race can endure the labor of cultivating them. But our elevated lands, produce the mulberry equally as well as the river lands, and are extremely healthy. And the silk-culture, not being adapted to slave labor, might occupy the hills, while cotton should be confined to the low-lands. They need not interfere with each other, but be a mutual support, for each should employ a distinct class of the population, and occupy different locations. The alluvial plains of the rivers will be laid off in large cotton plantations, with but few white families, while the hills will be covered with a dense free population, of small farms, and family manufactures of silk. The grape, also, that now luxuriates in native wildness, will be subjected to cultivation, and made to vary, beautify and enrich the scene.

Respectfully, yours.

REMARKS BY THE EDITOR.

In sundry parts of the former volumes of this journal, we have urged the advantage and necessity of using calcareous soils for grape-culture; and, more recently, have expressed the opinion that the same kind of soil was peculiarly adapted to improve the growth of mulberry trees. But as to both, our views were more theoretical than practical, and were deduced from indirect testimony, rather than positive facts. In the foregoing highly interesting article (to us at least, and on this account,) are presented the first positive proofs, in the greatly superior growth, or product, of both the morus multicaulis and of grape-vines, on soils which would be excessively calcareous for most other plants. The facts are highly important; and the truths which they sustain, if properly appreciated and applied, would be worth millions of dollars annually to this country, even if confined to vine and mulberry culture alone.

The foundation and origin of our opinions as to these particular adaptations of calcareous (and highly calcareous) soils, will be here concisely stated. Vine-culture, both for the production of grapes and of wine, so far, has been in this country, generally as unsuccessful, as it is generally successful in the wine regions of Europe. In examining for a difference of circumstances, sufficiently marked and general to be the cause of this difference in effects, nothing satisfactory was offered to our mind, except the remarkable difference in the constitution of soil, which we had before learned from prior investigations, directed to more general and more important objects. The well cultivated and most productive soils of Europe, are generally calcareous; and the particular vineyards which are celebrated for producing the most valuable wines, are known to be on calcareous soils. On the other hand, we had fully established, to our own satisfaction, the novel and astonishing fact, that in all the Atlantic slope of these states *there was no calcareous soil, proper*—and that there was but a very small proportion even of soil altered by shell-beds coming to the surface, broken lime-stone, or other such rare and accidental admixtures. Hundreds of miles might be passed over, in travelling through the country, without the traveller coming in sight of an acre, or even a square-yard, of natural calcareous soil, or any containing even so small a proportion as one-thousandth part of carbonate of lime. And yet, so sure are the marks of calcareous earth in soil, that the traveller who had properly investigated the subject, could pronounce as safely and correctly as to its deficiency, on the most transient observation, as upon thorough chemical analysis. Upon subsequent investigation and information, we further learned the very different and scarcely less important fact, that most of the great prairies of the west were as remarkably constituted, in their great abundance of calcareous parts, as the eastern regions are for the entire deficiency. Indeed, the prairie regions of this country present the only considerable soils known in North America, which contain any great proportion of carbonate of lime, or where that ingredient is in hurtful excess, or is so often the case in some parts of Europe.

But all the trials of grape and wine culture which had been made in this country had been confined to the non-calcareous region; and so far as we knew and believed, not an acre of vines grew on highly calcareous soil, if even made moderately calcareous by compound manures, applied

without such design. It is not that calcareous soil is necessary to make the vines grow luxuriantly; nor *always* to make them yield a heavy crop of fruit. But we deemed it essential to make the vines as regularly and certainly productive in well ripened fruit, as in other regions, and still more, to render it fit for wine of sufficient strength, and best quality. Climate may have much agency in preventing equal success in this country; but the defect of the soils heretofore used is not the less certain, and alone, as we think, a sufficient cause of general failure. It was on these grounds that we urged on vine-culturists, through this journal, to use calcareous manures; and by private correspondence also, on Mr. Herbemont particularly, who had done so much for this branch of industry, we endeavored to impress the propriety of making highly calcareous at least as much of a vineyard as would serve for a separate making of wine. But though he was satisfied with the correctness of the views, his location, remote from calcareous manures, prevented his putting them to practical use; and until reading the foregoing article, we had not heard of any such designed experiment, or even of any comparison of results, between the products of vines on calcareous and non-calcareous soils. Our own position, removed from our land and cultivation, and therefore being incapacitated from superintending either, forbade any such trial of a new and costly culture, merely for experiment with a view to the promotion of public interests.

In regard to the peculiar fitness of calcareous soils for mulberry trees, our opinions were more lately formed, but not the less decided; and in this also, the first positive and unquestionable evidence is furnished in facts stated in the foregoing letter. The facts which had induced our forming this opinion, (and which was stated in the last, and in previous numbers of the Farmer's Register,) were the following, which seemed full and sufficient.

On our own farm, and elsewhere on the borders of James River, where the great diversity of natural soils afforded excellent grounds for such observations, both the white mulberry and the native mulberry trees are a common growth on the hill-sides, and the few other places where the marl reaches the surface, or affects, by admixture, the character of the soil. And on the hundred-fold more extensive table lands, of poor and acid quality, mulberry trees are rarely found. The remarkable and seemingly peculiar fitness of the river hill-sides for this growth is generally known to the residents; but it is not known, what is certainly true, that the presence of calcareous earth in these soils is the sole cause of this peculiar fitness. So strongly has the fact been impressed on some cultivators, though without inferring the cause, that the white mulberry is considered as a troublesome cumberer of the ground on some arable lands, the growth of which it is difficult to keep down and impossible to eradicate, by the periodical cultivation of grain crops. Very recently, we heard an excellent farmer object to planting the morus multicaulis on his land, because he feared that it would so spread as to become as troublesome an intruder in his fields, as he had already found the white mulberry to be. It may be remembered by some of our readers, that the native mulberry leaves which were of such extraordinary large size, as stated at page 417, vol. VI. Far. Reg. were from a young tree which grew in a bed of poor sandy marl.

What has been already stated on this head, however defective and incomplete as proof, will be enough to induce those who will think and reason to pursue the investigation of the subject, and supply the unquestionable and direct evidences which we have not to offer. Sooner or later, it will be a truth of universal acceptation, that, in addition to all the other advantages offered in the use of calcareous manures to agriculture, that both vine and mulberry culture, in a peculiar and remarkable degree are improved by their liberal application.

From Loudon's Gardener's Magazine.

NOTES TAKEN FROM THE NARRATIVE OF A HORTICULTURAL JOURNEY IN GREECE, DURING THE SUMMER OF 1837.

By Eugene Achille Baumann, of the Bollwyller Nursery.

I know not whether a short account of the present state of horticulture and agriculture in Greece might not interest some of your readers. It is true that this country is daily visited by travellers, your countrymen in particular, who, in their narratives, infinitely more interesting than mine, introduce every thing worthy of notice; but this celebrated country presents so many curiosities of all sorts, that horticulture, the subject which particularly interests me, and which is at the very lowest ebb, could never have particularly attracted the attention of any one having a different mission from mine.

After having visited almost every part of Italy, where I found many things to interest me, I arrived at Trieste in the spring of 1838, regretting much to be obliged to leave that fine country. At Trieste, however, I received the necessary instructions from my friends for undertaking a still longer journey. I was to proceed to Athens in Greece. The object of my journey was to open some commercial negotiations with the amateurs of the country, as well as with those persons at the head of the government who might be favorable to an

enterprise of this sort. A new country, or, rather, one rising out of total ruin, like Greece, presents many fair chances: for, the want of vegetables and fruits, as well as of forest trees, is very soon felt in a country so situated. What particularly induced my family to this step, was, that for several years past we had been sending ornamental and fruit trees to a considerable amount to the Greek government, as well as for the plantations of King Otho.

I embarked about the middle of May, 1837. Finding a favorable opportunity for extending my journey to Smyrna and Constantinople, I went direct to Smyrna *; thence I went by land to Brussa and Scutari, and arrived in Greece, after a stay of some weeks in Constantinople, and a quarantine of twenty-four days in the Isle of Syra.

I arrived in Greece about the end of July. What a difference between the coasts of Attica, or of the Peloponnesus, and those which I had just passed! The shores of Asia Minor, of the Bosphorus, and of the Dardanelles, are filled with gardens, which present to the eye of the traveller a vigorous vegetation, as varied as the nations which inhabit them. Those of modern Greece were naked under the burning July sun; the little vegetation which had flourished there had been completely withered up; and before I perceived some signs of habitation, I thought I was landing on a rock abandoned at once by man and nature. I saw nothing above the surface but some remains of the gigantic monuments of the ancient Greeks.

I landed at the Piræus, and proceeded, soon after landing, to Athens. The road which led to the city was new; on the right and left were planted, at a considerable distance from each other, plane trees, poplars, alders, and some walnut trees. It was rather difficult to distinguish these trees at first, as they were generally in bad condition, and the greater part of their imperfect heads were without foliage.

The road also passes through a forest of olive trees; it is the only thing in the neighborhood of Athens, useful to the inhabitants, that has not been entirely destroyed by the stolid ferocity of the Turks and Egyptians. This forest made no better impression on my imagination than the first aspect of the country. Those who have seen forests of olive trees know that their livid hue entirely changes the character of the landscape.

I arrived at Athens; and the first thing that struck my sight, that delighted me, was not so much the imposing aspect of the Acropolis, and of the Temple of Theseus, as the finding of a date tree, nearly 50 ft. high, growing in the middle of the Via d'Hermes. This date tree had continued to grow, and had not been injured by any one; besides this specimen, I saw five or six others in the different districts of the city, also several cypresses, but these were all.

It must be confessed that Athens, for a celebrated city, presents but a denuded aspect; this cannot be said, however, of some places, situated at a little distance from the city, such as the village of Marupi, that of Kephyssia, Angello-Kibi, &c. In these places we meet with a tolerably vigorous vegetation. At Kephyssia several foreign ambassadors have country houses; the Russian ambassador particularly has a large establishment; and there is there a magnificent group of plane trees, *(platanus orientalis,)* planted, no doubt, by some Turk. There are also a considerable number of mulberry trees, some fruit trees, pear, apple, and plum trees. Close by is a very old plantation of olive trees; and in the neighborhood flows a small rivulet, the banks of which are adorned by a very vigorous vegetation of *laurus nobilis, myrtus communis, vitex agnus castus, ceratonia siliqua, melia azederach,* several *rhamnuses, &c.* These trees, both large and small, are every where alternately intertwined with vines and *vitex agnus castus;* and, where the moisture does not reach, an immense number of myrtles grow. *Pistacia lentiscus* also grows there profusely; in short, one is agreeably surprised at the great variety of brilliant foliage which abounds there. The *nerium oleander* is particularly beautiful; it towers above the other shrubs which surround it, and presents a flourishing bouquet throughout the year.

These villages were formerly places of rural retreat for the Turks, as they are now for the Greeks. I found every where the remains of Turkish houses; which have been quite destroyed, except the fountains, which are always shaded by some fine planes, or horse-chestnut trees *(æsculus hippocastanum).* I have never seen these trees so well grown, or so perfect, as in the neighborhood of these fountains; it appears as if nature herself chose to protect and shade those fountains which the Turks erect wherever they can find a spring; and near each is inscribed a passage from the *Koran,* which invites the toil-worn traveller to come and quench his thirst.

This is all that can recall an idea of what horticulture was in Attica, before the war against the Turks; and while it continued, nothing could be done. During my stay, however, I had an opportunity of seeing that, under Bavarian influence, the Greek government will bring the horticulture of this country to a high degree of perfection. Before the death of Capo d'Istrias, a nursery had been formed near Nauplia, which was then the capital; but this nursery is now neglected. I saw the greater part of the fruit trees which were sent to it from our nurseries at Bollwyller, either dying or already dead, although but recently neglected. At Athens, a new nursery had been made, and, while the greatest care was bestowed on it, the former was abandoned to neglect, and finally given up.

The Athenian nursery is under the direction of Dr. Fraas of Wurzburg, a young man who devotes himself with ardor to the labors and cares which his charge naturally brings along with it. The place which it occupies was formerly the garden of a Turkish proprietor, but the king bought one part of it, and the government the other.

Hitherto only such trees and shrubs as were most wanted in the country have been planted in the government part of this garden. In the part belonging to the king, such culinary vegetables are cultivated as the country does not produce naturally; such as cabbages, asparagus, salads, peas, kidney-beans, &c. A great number of fruit trees have also been planted, which grow well; some plum and pear trees were there previously, as well as some vine stocks, and mulberry and pomegranate trees. Fig trees were plentiful.

* I proceed to Smyrna, touching at Ancona, Corfu, Patras, and Athens, and reach Smyrna by Syra and Scio.

Of ornamental plants, Dr. Fraas had planted a certain number of dahlias, which I brought from Trieste and left at Athens, on my first journey there. On my return, after a very short period of time (two months,) I found all these plants grown and in beautiful bloom; besides this, I saw a fine collection of annual plants, which grow there with unexampled rapidity and vigor.

We may rationally conclude that the country has not always been so bare of vegetation as it is at present: the soil is very fruitful and good in the plains; though less so on the elevations of the mountains, which are generally calcareous. The best proof of the fertility of the soil is, that Dr. Fraas having had a number of mulberry trees transplanted, the stems of which were generally more than a foot in diameter, they all, without a single exception, continued to grow. The year after their transplantation the heads were a little cut, and in a few months afterwards, they formed new ones, which exceeded the old ones in strength, size, and thickness.

The Athenian nursery is situated in the forest of olive trees mentioned at the beginning of this paper, at about half a league from Athens, on the road which leads from that city to Eleusis.

On the other side of the road, the military commander has had the soil prepared, where the olives are planted regularly, and cultivated for the advantage of the Bavarian garrison; peas, kidney-beans, cabbages, turnips, &c., are raised here very successfully. This place, as well as the king's garden, can be easily watered by a conduit, which proceeds from the city. Watering is very necessary, and it is not surprising to see an almost total want of vegetation in so warm a climate; at Athens particularly, since this rivulet, if I may so call it, is the only one which supplies water during the whole year. We read in ancient history, and see in many modern maps, several rivers marked near Athens. In the time of Alexander the Great, as we are told in history, a small part of his cavalry was sufficient to exhaust the water of the Cephisus; at present its bed is very perceptible, but I never saw a drop of water in it. In the neighborhood of the city several other dried up beds of rivers are also pointed out.

The resident plenipotentiary of Austria, M. le Chevalier Prokesh von Osten, has also formed a garden in the English style. He planted chestnut trees, *catalpa syringæfolia*, *acacias* of different sorts, some of which have grown, but many have perished. Prince Puckler Muskau, who arranged the plan of this garden, advised him to plant at first *en masse*, all the trees that would grow rapidly during the rainy season, to procure, at least, some shelter for trees of a better quality. He did so, and, as far as I could observe, he will derive advantage from it. The poplar grows with astonishing rapidity, notwithstanding the great drought. *Pinus pinea* and *P. maritima*, which grow every where on these shores, would also be ornaments to these gardens, as their forms are agreeable; and the other species of *coniferæ*, cultivated in our plantations, do not thrive so well here as these two species.

An Italian landed proprietor has also formed a garden in the neighborhood of Athens. I observed with pleasure the rapid growth of a great number of fruit trees, chiefly apple and pear trees, which he had planted; many of them were loaded with fruit. It is also worthy of remark, that date stones, sown in the open air, have come up and grown admirably, in this gentleman's garden, as well as in the king's garden.

Before my departure, M. Lang of Darmstadt, a very able architect, was commissioned to make a plan of a private garden, which was to be formed near the new royal palace, the building of which was proceeding rapidly. A public garden, in the English taste, was to be joined to the former, to surround it, and be a place of resort for the population of Athens.

The new palace will be magnificent and very large. The beautiful marble of Pentelicus is almost the only material used in its construction.

M. Lang decided immediately on the Italian style for the king's private flower-garden, marking on the plan the place for a good number of palm trees, and groups of orange, lemon, and oleander trees. The whole to be divided into compartments by low walls, ornamented with statues, vases, &c., of marble, which they expected to find in the ruins of the ancient monuments. I have no doubt that, when the whole is finished, I shall be put in possession of the plans and elevations, and I shall then have much pleasure in transmitting them to you.

I think Greece is a country in which a garden well planted and executed would have a magical effect. All sorts of trees might be used in the arrangement. I even think a great number of South American trees would thrive. What could we not effect by uniting the *passifloras kennedyas*, and the superb and light *acacias* of New Holland, with groups of oleander, myrtle, and *laurus nobilis*, crowned by magnificent date trees, evergreen oaks, *acacia julibrissin*, *cupressus pyramidalis* and *horizontalis*, and orange and lemon trees! All these would thrive; and the Greeks would be happy in being able to enjoy their gardens all the year round, while we are obliged to witness five or six changes annually, every one more disagreeable than the other.

Add to this the magnificent and imposing views of the sea, of the Gulf of Salamis, of the ruins of the Acropolis, of the Triumphal Arch of Adrian, of the ruins of the temple of Jupiter Olympus, &c., and we may easily conceive the beauty that might be given to an Athenian garden.

I shall not forget to communicate to you, at the same time, some particulars as to the customs of the Greeks themselves, with respect to the subject that interests us.

Their culinary vegetables consist generally of young pumpkins, not fully grown, *cucurbita lagenaria?*, with other species and varieties; the fruit and seeds of *hibiscus esculentus* are used exactly as peas and kidney-beans are here. Their taste is rather sour and very refreshing; tomatoes *(solanum lycopersicum)* are used all over the country in almost every dish. *Cicer arietinum* is eaten by the common people, who generally carry some of these plants in their hands, eating the seeds without any preparation. *Cucurbita citrullus*, the water-melon, is brought in immense quantities from the islands of the Archipelago. The people eat them greedily; they are very good and refreshing, but somewhat dangerous. Several other kinds of melons are also brought from the islands, some of them of an exquisite flavor. The flail is not used for thrashing out the corn in

Greece. In every village there are round paved places, where the inhabitants spread out their corn, and have it trodden out by horses. On the arrival of the Bavarians in this country, an officer ordered several flails to be made, with the intention of teaching the Greeks their use; and some soldiers were set to work with them for this purpose. The Greeks, of course, approved of the new way for them; "but why should we tire ourselves," said they, "when our horses can do it as well with their feet?"

That awkardness, or idleness, which is perceptible on many occasions, struck me particularly on seeing them digging or trenching the ground. It is extraordinary how men in this warm climate can remain bent, and sitting on the calves of their legs, or, rather, doubled on their legs, for hours together, and not upright, as every where else, working with implements which never have longer handles than from 2 ft. to 2 ft. 6 in.

The climate of Greece being so favorable for the vine, accounts for the country also abounding in wine. We must not, however, expect to see the vine cultivated regularly; the stocks are planted, they are allowed to grow, and they are thought of no more till the time of the vintage. Those wines which come from the islands are very good and light; those, on the contrary, which are made on the continent, for want of cellars and reservoirs for keeping them in, are always mixed with resin or gypsum. The taste produced by this mixture is at first extremely disagreeable, particularly when gypsum or plaster-of-Paris is used. I soon got accustomed to the mixture of resin, which seems at first to be turpentine. The latter custom, in this warm climate, is a very good means of promoting digestion.

This is nearly the amount of the notes which I wrote during my stay in this country. I can, if you wish it, communicate other matters to you, perhaps still more agreeable than these.

Soho, London, September, 1838.

From the Southern Agriculturist.

IRISH POTATOES FROM SLIPS.

Irish potatoes may be grown from the slips, like the sweet potato. As soon as your potato tops have grown about one foot high, cut them off and plant the same as you do to the sweet potato, only have the beds nearer each other. The potatoes from these will be later, but they will be more numerous, and decidedly more mealy.

OLLA PODRIDA.

To the Editor of the Farmers' Register.

March 22*nd*, 1839.

In one of the late numbers of your Register, I have read what I consider a very just complaint against most of your early correspondents, who are yet in the land of the living. It is, that they appear to have grown weary in the good work of contributing to your paper, as their communications have gradually been diminishing in number and frequency, until you rarely hear from them at all. You and your readers, I think, will all acquit me of this fault, for my fear has generally been that I should over-do the matter; but nevertheless, I will venture to send you something, lest others better qualified should be unmoved by your appeal.

You must long ago have been convinced that I most heartily wish success to your Register on *your own* account; but you have yet to learn that I wish it also, because I take a pride in it, as a work of good old Virginia, concocted out of her own materials, and by a native-born Tuckahoe.* To aid it, therefore, in every honest way that I possibly can, is a matter which occupies much of my thoughts, and prompts me, perhaps oftener than is useful, to be scribbling for it. This, however, having no other object than the good of our cause, is never designed to impose upon you more trouble than that of perusal; since to see myself in print, very rarely, if ever, forms any part of my motive for addressing you. Let me then again repeat, as I have often done before, that you are at perfect liberty to destroy whatever of mine you do not deem fit to publish.

At present I have nothing to offer but certain suggestions brought to my mind by your just complaints of the increasing want of original communications—suggestions, which, if followed out, as your own judgment might direct, would add, I am sure, considerably to the interest of your highly useful journal. One of these is, to re-publish, when you are hard run for fresh matter, short articles, from some of our comparatively old agricultural works; for instance, the American Farmer, which consists of 16 quarto volumes. My reason for this recommendation is, that such works, when published periodically, are almost always treated as waste paper. Their contents, therefore, are very soon entirely lost and forgotten. *I*, who read every agricultural work I can lay my hands on, and carefully preserve all I subscribe for, was forcibly reminded of this fact a few days ago, while searching the American Farmer for something of which I had a faint, but imperfect recollection. My attention was so completely arrested by several highly interesting and valuable articles, which I had utterly forgotten, that I was near losing sight of the first object of my search. Had I seen them in your paper, without a mark of quotation, I have no doubt that I should have taken them for original communications to yourself; and I am very sure that the same thing would happen to hundreds of your other subscribers; for there are multitudes of us agriculturist who require "*line upon line*," and "*precept upon precept*," to enable us to retain in our memories what we learn of our profession from books; especially if they are published piece-meal.

Still older works than the American Farmer

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* Would you believe it? There are hundreds of native-born Virginians still so ignorant of the early history of their own state as not to know that a root called "Tuckahoe," was a common article of food among the Indians, when Virginia was first settled by the English. It is indeed, a great botanical curiosity (now very scarce,) for it has neither root in the ground, nor stem above it; but grows a few inches below the surface, apparently as unconnected with the soil as a buried cannon ball would be. It is oval in shape, and varies in size from that of a goose egg to that of a man's head. The coat is rough and of a dark brown color; the inner substance is very white, similar in texture to that of the yam, and of an insipid taste. I believe it is found in the Carolinas, as well as in Virginia.

might often afford some very useful information, mixed up with various things which would probably prove to many, as they have done to me, exceedingly amusing from the very odd and queer style in which they are related, as well as from the subject matter itself. Take, as a specimen, the following droll captions to certain chapters in a work published in England about ninety years ago, in eight octavo volumes, by one William Ellis, who signed himself "Farmer," and called his book "the Modern Husbandman."

Captions.

"A curious case, proving how a farmer lost great part of his wheat crop by his ignorance and covetousness."

"How one farmer broke, and another had like to do the same, by wrong ploughing the ground."

"How a yeoman lately living near Chasham, got a considerble estate by managing his land better than most of his neighbors."

"How some farmers clean and manage the top bushel of a sack of wheat for the better sale of the whole quantity they bring to market."

[By the way, we have been much scandalized on our side of the Atlantic, if we want much teaching in this art.]

"How a farmer starved his cow, and thought it occasioned by witch-craft."

Some of this sagacious fellow's descendants, I suspect, must have emigrated to and multiplied exceedingly in the Ancient Dominion; for we witness even now, not a few cases of this species of witch-craft in our good old state, especially during the two first spring months.

"How a gentleman run out part of his estate by ill management, and recovered it by his good conduct." If Farmer Ellis had only added to this information how the recovery was to be effected when the *whole* estate was run out, instead of *a part*, his recipe would have been above all price, particularly on the south of "Mason and Dixon's Line." But I have given you titles of chapters enough to enable you to form a pretty correct idea of the character of the work, although I cannot dismiss my notice of it without a few more remarks. As a book of receipts, I have never seen its match, at least in point of number, except the "Universal Receipt Book," which, as Maj. Downing would say, "beats all nature." What think you of no less than eighteen consecutive ones for killing rats!! and most curious things they are. One is to bell the rat instead of the cat; another is, to singe one of these vermin and turn him loose. This struck me as peculiarly good, for I had a distinct reminiscense of an unlucky snuff, which I accidently received some years ago, of this most offensive odor; and I determined to try the experiment forthwith. But my operator, who was a small negro boy, without any experience in the business, singed so closely that the unfortunate rat gave up the ghost before he had an opportunity of funking his former associates out of their respective hiding-places.

You will probably think that if the rest of Farmer Ellis' receipts are like the two foregoing, they are of very little value, but you may take my word for it, that many of them appear well worth trying, and that his whole work deserves a perusal.

From this author I have learned what I never knew before, in regard to that excellent grass, the lucerne. He begins his account of it with the following words: "I must confess *he* has hit this, the best of any of the grasses." According to him, it was first known to the English at Aleppo in Syria. In Arabia Felix, he says, "they got vast burthens of it once a month. From Aleppo, it was brought into several parts of the Mediterranean, and particularly at Minorca, it grows in such perfection that it is now their chiefest subsistence for their cattle. From thence it got more forward into Europe, and is now planted in abundance of places, and more like to be, for its many extraordinary beneficial qualities." He proceeds to remark: "I cannot find by what authority late writers call this grass by the names of Medic-clover, snail-trefoil, or Burgundy fodder, otherwise than that they have a mind to give it nominal flourishes, without any warrant from former authors," &c. In regard to the quality of the seed, and the proper quantity for an acre, sown broadcast, he says, that no seed are good but the purple or brown, that ten pounds per acre should be used. By the way, he states the mode which I have seen mentioned elsewhere, and have proved to be good, by which we may ascertain the soundness of any seed resembling the lucerne in its nature—such for instance, as clover, turnip, cabbage, rape, mustard, &c. It is simply to put them into a hot shovel, where they will soon pop, if they are sound.

Were I to give you all that I have found in this old writer, to amuse and instruct me, I should be obliged to send you a pamphlet, instead of this rambling letter; I must therefore "stay my hand," although I cannot prevail on myself to do so without adding some excellent advice which he offers both in prose and verse. The first is from a rhyming farmer of Queen Elizabeth's day, whom he called "old Tusser," and whose pithy admonitions he heads with that well known and admirable precept, "Make hay while the sun shines." But let Tusser speak for himself, and thus he sayeth:

"If weather be fair, and tidy thy grain,
Make speedily carriage for fear of a rain;
For tempest and showers deceiveth a many,
And lingering lubbers lose many a penny.
Be thankful to God for his benefit sent,
And willing to save it with earnest intent."

Take the following very brief apothegm as a specimen of Farmer Ellis' own poetical talent, for it seemeth that he also was a perpetrator of verse.

"Do not with ignorance unjustly deal,
All secret wrongs to Heaven have appeal."

The other article is a part of a letter from one of his numerous correspondents in reply to one of his own; and he thus quaintly doles out to us, what I think you will pronounce well worthy the attention of us all. Here it is,

"As to your comparison: most men, 'tis true, of any figure in life, are too prone to inconstancy and change in all their actions, as well as appetites; and must have the whole globe of earth and sea ransacked to gratify their inordinate desires. But this luxurious disposition is not, I hope, so much implanted in our natures, as 'tis owing to our indulging ourselves too much to ease and idleness; for set a good joint of meat before my ploughmen or laborers, every day the same, give them but enough, and I will answer for them, they will behave themselves very well in their several attacks, and be lusty and healthy at the

year's end; though perhaps, their lazy master's stomach would have risen against the third meal. Nor did I ever find that my working horses or oxen refused the same hay and corn the year round, but eat clean up as much as was given them, while those that were pampered and fed, and kept sleek and fine for market, were as whimsical and squeamish as the nicest beau. This must be attributed to the want of due labor and exercise. 'Tis just the same with the earth; for take a small piece, and manure it very well for some years, without either ploughing, or mowing, or feeding on it, *for there are exercises of the earth*, and it will denote a foulness of stomach, by putting forth nothing but rank weeds; but after you have given it sufficiently of these exercises, you need not fear clogging its stomach" (a very needless caution this, to most of us Virginia farmers,) "with too much and too constant food, if it be a proper sort; for it will always manifest a good digestion, by the grateful returns it will make you."

On the subject of agricultural machines and implements, Ellis treats very largely, and describes several as long used in England, which have been supposed, in the United States, to be modern inventions of our own. I will invite our brethren to make trial of at least two which he extols very highly. These are the prong-hoe, (or "hough," as he spells it,) and the "beck-hough." I can say of the first, after more than twenty years use, that it is incomparably the best implement for taking up and throwing coarse manure into a cart or other vehicle used for the purpose, that I have ever seen. It is also far preferable to any other for cleaning out wet drains obstructed by trash of any kind, and it is an excellent tool for hoeing up garden ground, as it pulverizes at the same time. Although it is much used in some parts of our state, yet I know that in others, it is entirely unknown, and therefore I confidently recommend it. The prongs (three in number,) should be flat, about an inch or inch and a quarter wide at the widest part, and tapered to ¾ of an inch at the point, which should be sharp and well steeled. Their length should be about that of a common hilling-hoe, and they should be slightly curved inward. The whole width of the implement, including the spaces between the pronge, many be about eight inches, although the whole size should be proportioned to the strength of the person who is to use it. The beck-hoe I have never seen, but am so well satisfied with Ellis' description of it, that I shall certainly try one as soon as I can get it made. He says, "it differs from the common pick-axe, or mattock, only by having its two ends about four inches broad." He adds that, "at Farnham, in Surry, it is so esteemed, that there is hardly any other tool used to weed their hop-grounds and allays, and to keep them clean and hollow; for by its make, the digger can enter the earth deeper than with either the prong-hand-hough, or prong-spade; and it is with this tool that they keep their plantations of hops in a most fine tilth," &c.

Whilst I am on this subject, permit me once more to recommend, most earnestly, the *drag-log* —the credit of contriving which is entirely due, I believe, to your worthy correspondent, Mr. Gay. For the combined qualities of simplicity, cheapness, and utility, I have met with nothing that will bear any comparison with it in regard to the purpose which it is designed to effect, and that is *pulverizing the soil.* This it will most certainly effect by being dragged only once over the surface, far better than either harrows or rollers can do it by passing two or three times, while the draught is very little greater, if any, than that of the largest sized harrow made for two horses. The first time I used it, (which was as soon as I could get one made, after reading Mr. Gay's description of it,) I became thoroughly satisfied of its great superiority to rollers and harrows for reducing land to fine tilth preparatory to sowing or planting any thing; and I have been using it ever since. Both the last mentioned implements are very useful for other purposes, and therefore, nothing here said is designed to supersede them by the drag-log, but merely to represent their great inferiority as pulverizers and crushers of rough, cloddy land.*

And now, my good sir, having succeeded in a part at least, of my design, which was to make this epistle a kind of hotch-potch affair, in the hope of affording to you and your readers some variety, as well as a mite or two of what may be useful, I will conclude by proposing, (as you seem fond of giving captions to the communications of your correspondents,) that you should entitle mine an "Olla Podrida, or dish of all sorts," and heartily wishing that it may prove palatable,

I remain, dear sir,
Your old friend and constant reader,
J. M. G.

From the Farmer and Gardener.

BROOM-CORN-CROP.

The proprietors of the broom factory at Georgetown, D. C. take pleasure in laying before their agricultural friends, an accurate statement of the product of this new grown crop. The estimate is made on the measurement of seven acres of land the last year, although the season was unfavorable for corn. From the seven acres they secured 24,488 lbs. of broom brush, cut with six and seven inches stalk, with seed on.

After taking the seed off, the net brush weighed, - - - -	5,549 lbs.
The seed measured from the same,	473½ bush.
and weighed 40 lbs. per bush. making	18,939 do.

Recapitulation.

Net weight of the brush from 7 acres,	5,549 lbs.
Net weight of seed from the 7 acres,	18,939 do.
Making the gross weight grown,	24,488 do.

Value of crop as follows:

5,549 lbs. of net brush, at 5 cents per lb. or $100 per ton, - - -	$277 45
473½ bushels clean seed, at 50 cents per bushel, - - -	236 75
	$514 20
Amount of crop grown per acre on seven acres, - - -	$73 45¾
It would be well here to state, in the year 1835, with a more favorable season, the same seven acres of land was planted in Indian corn, and produced 57½ bbls. and sold at $4 50 per bbl.	$231 75
Making the difference in favor of broom-corn, on seven acres, -	$272 45

* The drag-log was fully described, and its peculiar advantages stated at page 751, vol. ii, and 616, iii. Far. Reg.—Ed.

The Indian corn-crop per acre, was about $33 10¾. Making the difference in favor of broom-corn $40 35.

For planting, our own experience has taught us to lay the land off three feet each way, so as to avoid hoe-labor. This distance will give 4800 hills per acre. On the above described land we would leave from 10 to 15 stalks in the hill. The preference is given to the finest brush. Half a gallon of seed will plant an acre carefully dropped.

Any farther information can be had, by application at the factory. The propretors of the Georgetown broom factory have, with great care, selected their earliest and best seed for planting, and offer it to the farmers at a moderate price. For securing the harvest, will be hereafter noticed.

GEORGE T. MASON & Co.

From the Second Report of the Agriculture of Massachusetts.

DAIRY HUSBANDRY.

I proceed to speak now of another of the great interests of the agriculture of Berkshire—the dairy.

The dairy business has always been a great business. For a time it gave way to the raising of fine wool, when the prices of that staple were high. Since the abatement of the demand for wool, with that caprice for which mankind always have been, and there is reason to think always will be remarkable, many farmers have sacrificed their flocks; and are now giving their exclusive attention to the dairy husbandry. These changes, in matters so important as the dairy or the sheep husbandry involving, as they do, a considerable investment of capital, and many expensive fixtures, cannot be suddenly or frequently made without risk of serious loss and disadvantage.

The county of Berkshire is admirably adapted to the dairy husbandry. Grass is every where abundant. The soil is suited to the cultivation of esculent vegetables in the highest perfection. Several increasing manufacturing villages, with their swarming population, require supplies from the farms in the vicinity. Besides this, the great mart of the country, the city of New York, is easily accessible. Most of the farmers in Berkshire can reach Hudson with their produce, by a journey of four to eight hours, and put on board the boats at four o'clock P. M., it is in New York by an early hour the next morning. The farmer usually allows two cents a pound commission for the freight and sale of his butter; and, upon other produce, it is equally reasonable. He does not return from the river empty; but carries home a load of plaster, or of articles of necessity for his family. The great roads to the river, after the hills are surmounted, are among the best in the whole country. The rail-road, already open from Hudson to West Stockbridge, will afford to many of the farmers all the facilities they can desire for reaching the Hudson river.

Produce and expenses.

1. *Egremont.*—I will, in this place, state, as an example, the operation of a farmer who resided about twenty-five miles from Hudson. The great object of his attention was the making of butter, which was sold every week in the New York market.

From 18 cows he sold 2400 lbs. butter, at 23 cts. net. With these cows he fed 17 spring pigs until October, whose average weight was 177 lbs. each; half of this pork, say 88 lbs., was to be credited to the cow. He is of opinion, that when pork is $10 per 100 lbs., a cow will give at least $8 worth of pork per year.

Cow, Cr.		
133 lbs. butter, at 23 cts., (comm. paid,)		$30 59
Pork, - - - - - - - -		8 00
		$38 59

Cow, Dr.		
Wintering, - - - -	$12 00	
Pasturing, - - - -	5 00	
Salt, - - - - -	25	
Interest on $25, 10 per cent. risks included, - - - -	2 50	
		$19 75
Profits of a cow, - - -		$18 84

It is understood, that no extra feed is, in this case, given to the cow; and the butter and milk used in the family, it is supposed, will fully pay for the attendance. This is a fair profit; but it is, as I think, we shall presently see, much less than it should be. No animal is better entitled to good keeping than a cow; because none makes a more liberal return for all the extra kindness and feed and attention bestowed on her.

In another dairy, nine cows made 1550 lbs. of butter, and 300 lbs. of cheese.

Another dairy of twenty cows produced, of butter, 500 lbs.; of new milk cheese, 4000 lbs.

In this town, two acres of land are deemed sufficient for pasturing a cow or fatting a steer. Twenty head of cattle, made up of cows and three year old steers, were fatted upon thirty acres of land.

The subject of dairy-produce is of such importance, that I shall give various returns and calculations. I omit names; I should be glad to give them, and in a majority of cases it might not be disapproved; but a fear of giving offence, or of being thought to take an improper liberty, or of interrupting that freedom of communication, which I wish should subsist between myself and the farmers, and which seems indispensable to the success of the survey, induces me to withhold them, save where permission has been explicitly granted, or the nature of the case renders it obviously proper. The statements, which I give, rest upon undoubted authority.

2. In *Otis*.—Twenty cows gave 5000 lbs. new milk cheese, for sale; each averaging also 25 lbs. of butter; 600 lbs. of cheese were also used in the family.

Cow, Cr.		
280 lbs. cheese, at 8 cts., - - -		$22 40
25 lbs. butter, at 20 cts., - - -		5 00
Calf, - - - - - - -		4 00
Pork, 26 lbs. at 6 cts., - - - -		1 56
		$32 96

Cow, Dr.		
Wintering, - - - -	$12 00	
Pasturing, - - - -	5 00	
Interest on cost of cow $15—10 per cent., - - - -	$1 50	
Labor and attendance, - -	2 16	
		$20 66
Balance in favor of cow,		$12 24

3. *Lanesboro'*.—Sales from 12 cows: cheese at 12 cts.; butter at 25 cts.; gross amount, $600.

No account in this case is made of supplies in the family.

4. *Sandisfield*.—The average yield of a cow in ordinary seasons is rated at 250 lbs. with common keeping. By extra keeping, the quantity is increased to 350 or 400 lbs. The quantity of butter in addition, to each cow is supposed to be from 40 to 50 lbs., where new milk cheese is made.

The amount of cheese made in Sandisfield, in 1837, was estimated by a most competent authority, at 300,000 lbs.

Another farmer, with a dairy of 15 cows, states the average product of a cow, if she raises her calf, at 250 lbs.; if otherwise, 300 lbs.; and 25 lbs. butter also, from each cow. Four hogs may be kept to 20 cows. In this way, weighing 100 lbs. in the spring, they will weigh 300 lbs. in the fall. 140 lbs. of pork is to be credited to 5 cows.

The cost of wintering a cow here, is rated at $10; pasturage, $4. A good dairy woman will take charge of thirty cows, with assistance in milking and in handling cheese. Her wages will be $1 50 per week, with board.

5. In *Tyringham*, the average yield of a cow is reckoned at new milk cheese, 283 lbs., and butter at the same time, 57 lbs. A dairy of 28 cows gave 7912 lbs. new milk cheese, and 1600 lbs. butter. A large amount of pork was fatted on this farm; but it is difficult to say what portion of it is to be credited to the dairy.

6. In *Sheffield*, the average product of 28 cows was 394 lbs. new milk cheese, and 50 lbs. of butter each.

The product of a cow is thus stated by this excellent manager:

Cow, Cr.	
400 lbs. new milk cheese, at 8 cts., -	$32 00
Calf, (killed at three days old,) - -	1 00
50 lbs. butter, at 16⅔., - - - -	8 33
Whey and butter-milk, make one hundred lbs. pork, - - - - - -	8 00
	$49 33
Supra, Dr.	
Winter keeping, - - - - - -	12 00
One acre of land costing $50 will pasture the cow, - - - - - -	3 50
Salt 25 cts., 3 bs. bran $3, - - -	3 25
Int. on the value of cow at $25, 10 per ct.	2 50
Labor of milking, making butter, cheese, &c., - - - - - - -	4 00
	$25 25
Balance in favor of the cow, - -	$24 08

The quantity of land estimated for pasturage in this case seems small. It must be small for a general rule; another farmer in the same town assured me that he kept one yoke of oxen all the season, and one horse half the season, on two and a half acres of land, which he showed me. The land had been greatly benefited by plaster.

7. In *New Marlboro'*, the yield of a cow is estimated at 300 lbs. new milk cheese; 4 hogs are kept to 20 cows; 2 tons of hay are deemed requisite for a cow; value of hay sold $10; but if the farmer can realize $6 per ton for it used on the place, he deems it better than to sell it. Eight to ten acres of land here, with the use of plaster, is deemed sufficient for the pasturage of four cows.

8. In *Great Barrington*, 9 cows produced 1900 lbs. new milk cheese and 800 lbs. butter. In another case from 8 cows were sold of butter 200 lbs., of new milk cheese 1225 lbs. In another case 5 cows through the season, and an additional cow half the season, from 1st. June to 10th Nov., produced 651 lbs. butter; and 200 lbs. new milk cheese. In this case the weekly returns were given. The same farmer says, that his cows will average one pound of butter per day through the season. He states his cow account thus:

Cow, Cr.		
200 lbs. butter at 20 cts., -	$40 00	
Calf raised, - - -	2 00	
Butter-milk, and skim milk for pork, equal to all the care,		
	$42 00	
Supra, Dr.		
Wintering, 2 tons of hay, -	$16 00	
Pasturing, 25 cts. per week, 26 weeks, - - - -	6 50	
Int. on cost of cow $20 at 10 per cent. - - - - -	2 00	
		$24 50
Profits of a cow, - - -		$17 00

9. In *Alford*, the actual yield of a cow was as follows:

Butter, 240 lbs. sold.

Cheese 100 lbs. do., besides using what milk and butter were required by two persons. She had her own skimmed milk, but no meal or grain. She consumed, as ascertained, two tons of hay; and her pasturage was 25 cts. per week.

10. In *West Stockbridge* the report given is 300 lbs. new milk cheese to a cow; $40 are often obtained from a cow; $30 are deemed an average yield.

11. In *Stockbridge*, the proceeds of a dairy of twenty cows are thus given:

20 cows. 4000 lbs. new milk cheese sold at 9½ cts., - - -	$380 00
1000 lbs. skim milk cheese sold at 6 cts., - - - -	60 00
600 lbs. butter, sold at 9½ cts.,	150 00
	$590 00

This gives $29 50 cts. to a cow.

No account is made in this case of the supplies of the family, nor of the amount of pork fatted, both which items would greatly have increased the result.

12. In *Lenox*, the return of a dairy of 15 cows, was of new milk cheese 1200 lbs.; of butter 1800 lbs.

The return of another dairy is as follows:

10 cows produced of butter 1120 lbs. 8 oz., sold at 18 cts., - - -	$201 69
" " cheese, 800 lbs. sold at 9 cts., - - - -	72 00
	$273 69

13. *Tolland*.—From a highly intelligent farmer in a town adjoining the county, Tolland in Hampshire co., I received so particular an account of a dairy, that I shall here insert it though it might be thought to come more properly under the report of another county.

15 cows produced 4500 lbs. cheese, sold at 9 cts. per lb. - - - - -	$405 00
and 509 lbs. butter sold at 19½ cts. - - - - - -	99 25
	$504 25

Fifteen cows will nearly fatten 4 hogs, weighing in the spring 20 lbs. each; in the fall, 240 lbs. each. In this case it is deemed proper to credit the milk with 140 lbs. weight of each of these swine; 140 lbs. + 4 are equal to 560 lbs. pork at 8 cts. = $44 80—this divided by 15 gives to each cow a credit of $2 98⅔ cts.—

Butter and cheese 504 25, add pork 44 80=549 05.

The proceeds of each cow is $36 60⅓— add calf and rennet $1 00, $37 60⅓,	$37 60⅓

Expenses.

Wintering a cow, usual charge, -	$9 00
Pasturing do. $6 50, salt 50 cts.,	7 00
Interest on the value of a cow $23 at 10 per ct. - - - - - - -	2 30
One woman will manage the milk of 30 cows,	
Her wages $1 50 per week, 28 weeks, her board $1 per week	
Wages and board for a dairy of 30 cows would be $70, or $2 33 each, -	2 33
Additional help in milking and turning cheese 67 cts., - - - - -	67
	$21 30
Profits of a cow, - - -	$15 30⅓

No account in this case was taken of the butter and milk used in the family; but supposed to be not less than 150 lbs. of butter.

14. *Cheshire* is devoted almost exclusively to the dairy husbandry; and has been celebrated for the excellence and abundance of its produce. For the goodness of their cheese, however, I must rely upon authority. Its appearance in some of the dairies, which I examined, bespoke careful, neat, and skilful management.

A farmer with 25 cows, states their average yield at 300 lbs. cheese, and 20 lbs. butter to a cow. He says likewise that 1500 lbs. pork are to be credited to his cows.

The average cost or value of his cows is $30 each; wintering $14; pasturing 26 weeks, $6 25; he raises some calves upon whey. It requires the whey of two or three cows to raise a calf. His hogs at 18 mos. average 350 lbs.; they run in a pasture and have the refuse of the dairy until about six weeks before it is intended to kill them, when they are shut up and fed with corn and meal. A shrewed farmer observes, that, where swine in this way run in a pasture, it should be laid down as a rule, to have their trough always wet or always dry. This means that they should have as much whey as they are disposed to eat; or, by being kept wholly without any, they should from necessity get their living in the pasture. They require quietness of mind and freedom from restless desires in order to thrift; and they are like other epicureans whom variety and abundance render fastidious.

The dairy of another farmer consists of 20 cows. The year before last they yielded 400 lbs. new milk cheese; the last year 400 lbs. each, besides an ample supply of butter for the family. He calculates upon the proportion of one hog to four cows; with the above cows he made 1200 lbs. of pork, 600 lbs. of which he credits to the cows; he deems three acres necessary for the pasturage of a cow. His cows during the spring, have an allowance of rye meal and whey.

In another case the produce of 23 cows was 12,000 lbs. new milk cheese, and 500 lbs. butter.

Another case from 11 cows including 4 three-year-old heifers, there were sold and used 3475 lbs. new milk cheese, and 403 lbs. butter. Three hogs were likewise fatted; and it was considered that 400 lbs. pork were to be credited to the cows. Two tons of hay were required for the wintering of a cow, valued at $8 per ton; or she might be kept for hire at 50 cts. per week.

In another case 30 cows made 14,000 lbs. new milk cheese; and 500 lbs. butter. In this case some calves were raised; but most of them were killed at four days old. Throughout the county of Berkshire this mode of dealing with the calves is termed "deaconing" them. What is the particular propriety of this provincialism, I am unable to determine; and whether it had its origin in any superstition among the aborigines or the first setlers of the county, I shall leave to the antiquarians to accertain. It is a peculiarity, and prevails no where else.

The practice, with this farmer, is to give boiled corn in the ear to his cows; perhaps a dozen ears to a cow per day. When it is conveniently had, he gives a mess of rye meal to each cow, at the rate of two quarts per day, for three weeks in the spring. He is anxious to let his cows go to the grass as soon as the ground is bare. He thinks cows are liable to suffer from excessive feeding in the barn.

The wintering of a cow requires 1¾ ton of hay, - - - - - -	$14 00
Pasturing, 20 cents per week for 26 weeks, - - - - -	5 20

In 40 days of the best of the season on this farm 30 cows produced 4000 lbs. butter. The land required for the pasturage of a cow is considered to be three acres.

From thirty cows, an average of 425 lbs. of cheese has been produced to each cow, and ten lbs. of butter; or 300 the whole.

On one farm, where 18 cows were kept, 11,385 lbs. new milk cheese were made in a season, which gives the extraordinary average of 632½ lbs. to a cow. 200 lbs. of butter were made the same season from the same cows. One of these cows produced 1000 lbs. new milk cheese.

During the first part of the season, for two months, two quarts of rye-meal were given to each cow. Half of this quantity of meal was given them for one month during the last of the season; and the greater part of the time they had their whey. 100 lbs. pork were made on the farm; and half of this was credited to the cows.

The same individual, when on another farm in South Adams, with twenty-one cows, made 626 lbs. new milk cheese to a cow, in a season. 1700 lbs. of pork were raised in connexion with the dairy. Half the pork was considered due to the cows.

The process of making cheese began the 25th April, and ended the 1st December. As soon as the cows calved, the cows received three quarts of meal per day each—principally rye, with some Indian; and each had some whey, though not half what was yielded was given to them. Three or four of the cows received meal all the summer. He commenced feeding again with meal on the 25th July, and continued to give them two quarts of meal until the 25th of August. On the 25th of August, he began feeding the cows with corn-stalks until 10th September. Then the cows had the after feed of the fields; and from the 1st October, these cows had half a load of pumpkins per day. In November, fed every cow fully with meal; two and three quarts per day until 1st December. After that, the cows had nothing but hay until spring. From the same cows, at the same time, butter enough was made, and milk enough used, for a family of six persons. The cheese sold in New York for $10 per 100 lbs.

These products are certainly remarkable, and show what may be done by attention, skill, and good treatment of the animals under our care. The pasturage in Cheshire is of an excellent description. The soil is generally of a rich gravelly loam resting upon lime-stone, and abounding in vegetable mould. It is likewise sensitive to the application of plaster, which is very commonly used.

From the Genesee Farmer.

REPORT OF THE COMMITTEE OF THE NEW YORK AGRICULTURAL SOSCIETY ON ROOT CULTURE.

The committee appointed at the last meeting of the Society, to "report on the best vegetable or root crops for feeding cattle, and the best means of cultivating the same," report as follows:—

The culture of roots, as farm-crops, for feeding and fattening domestic animals, is of such recent introduction, and so limited, among us, and the few experiments that have been made, to ascertain the relative value of these roots, have been so loosely managed, that the committee do not possess the data that they could desire, to make a satisfactory report, adapted exactly to our practice. But they are nevertheless satisfied, from the numerous experiments which have been made in Europe, in a climate very similar to our own, and from the partial ones which have been made among us, that the culture of roots is destined to effect here, what it has effected elsewhere, a great and salutary change in husbandry, not only as furnishing the easiest and cheapest means of feeding and fattening domestic animals, but as an important source of fertility to the farm, and of securing the main point—ultimate profit, to the owner or cultivator.

Under these strong impressions of the advantages of encouraging and extending root-culture, your committee proceed, with the limited means at their command, to fulfil the duties assigned to them by the society.

The Highland Agricultural Society of Scotland, have recently awarded liberal premiums for experiments in fattening neat cattle; *first*, upon different kinds of roots, as the potato, turnip, and mangel wurtzel; *second*, upon raw and cooked food; and *third*, upon roots entirely, and a mixture of roots, grain, pulse and oil-cake. These experiments have been made with a view of accurately ascertaining the comparative value of each kind of root and other food, and the economy of each mode of feeding it. The experiments have been numerous. They have been upon ten to thirty head of cattle at a time; and they have been continued from three to six months. The animals were weighed or measured at the time of starting the experiment, at the close of it, and generally at intermediate periods, particularly when the food was varied; and the quantity of roots and other food given was accurately noted—so that the result has indicated the relative value of each kind of food in the fattening process, and the best mode of feeding it. The committee proceed to state, in a summery way, the results of some of these experiments.

1. *The relative value of different roots.*

Mr. Howden, with a view to the experiment, set apart the product of two acres of mangel wurtzel, amounting to fifty tons; five acres of Swedish turnips, being 140 tons; and two acres of potatoes, weighing 29 tons 4 cwt. The experiment was made with 21 head of cattle, which received, in addition to the roots, a few distillers' grains and a little straw. The following table shows the roots appropriated to each lot, and the monthly increase of the animals in girth. The abstract is made from the prize essays of the society, which cannot now be referred to; but the impression is, that in all the experiments which we quote, the roots fed to each lot were precisely the same in weight. Lot No. 1 was fed from the product of one acre of potatoes, one acre of mangel wurtzel, and one acre of Swedish turnips; No. 2 from one acre of potatoes and two acres of Swedish turnips; and No. 3 from one acre of mangel wurtzel and two acres of Swedish turnips.

Date.	Lot No. 1.	Lot No. 2.	Lot No. 3.
1831, Nov. 30,	35 ft. 8 inches	35 ft. 9 inches	35 ft. 8 inches
Dec. 30,	36 " 6 "	36 " 7 "	36 " 6 "
1832, Jan. 30,	38 " 2 "	38 " 4 "	38 " 2 "
March 1,	39 " 7 "	39 " 8 "	39 " 6 "
" 30,	40 " 8 "	40 " 10 "	40 " 6 "
April 30,	41 " 4 "	41 " 7 "	41 " 3 "

Twenty-eight tons of mangel wurtzel and Swedish turnips were withdrawn to feed other stock.

On the 30th January Mr. Howden took a pair of cattle out of each lot, and fed No. 1 with potatoes and water, No. 2 with Swedish turnips, and No. 3 with mangel wurtzel. The following shows their relative increase in three months.

Date.	Lot 1. Potatoes.	Lot 2. Swed. turnips.	Lot 3. Man. wurtzel.
1832, Jan. 30,	10 ft. 8 inches	10 ft. 5 inches	10 ft. 4 inches
April 30,	11 " 6 "	11 " 3 "	11 " 2 "

When the cattle were sold, the purchasers agreed that the lot fed on Swedish turnips were from 7s. to 10s. ($1.54 to $2.22) a head better than the other lots. The average advance upon the original value of each, was £6.12, and the cost of the grains being deducted, there remained £120 ($532.80) in return for the eight acres of produce consumed, or $66.60 for each acre.

From the above statement it would seem there is no great difference in the fattening properties of the three kinds of roots; and that so far as

measure or weight is concerned, it matters little which were employed in feeding. We will note here for future reference, the product per acre, of each kind of roots, upon Mr. Howden's ground, adding the product in bushels of 56 lbs.

The potatoes gave 12 tons 4 cwt. equal to 288 bushels.

The mangel wurtzel 25 tons equal to 1000 bushels.

The ruta baga 28 tons, equal to 1,120 bushels.

2. *The comparative economy of feeding raw or prepared food.*

In 1833 the society offered a premium of 30 sovereigns for the best report, founded on actual experiment made for that purpose, on a number of oxen or heifers, not fewer than six, the animals to be of the same breed, age and sex, and the term of feeding not less than three months. Several reports were received and published in 1834. From these we abstract the following:

Mr. Walker made his experiment with six two year heifers, and four two year old steers. Each parcel was divided into two lots, and fed on like food, except that one half received their food raw, and the other half in a steamed or cooked state. The food consisted of Swedish turnips, potatoes and crushed beans, with a little salt and straw. At the end of three months, it was found that the three heifers fed on steamed food had gained 48½ stone, or 679 lbs., and the three heifers fed upon raw food had gained 45½ stone; but the quantity consumed by the first lot exceeded that of the latter.

Cost of feeding on steamed food,	£14 1 3
" on raw food, - -	10 8 7½
The first cost more than the last,	3 14 8½

Deducting the first cost, and the price of fattening from the price paid by the butcher, there remained a profit on the three heifers fed with steamed food, of 9*s*; while the profit on the three fattened with raw food, amounted to £3 10*s* 6*d*. By a like estimate, the loss on the steers fed with steamed food was 3*s* 8*d*. and the profit on those fed with raw food 10*s*. 6*d*.

Andrew Howden made a like experiment with 18 cattle in six lots. Their increase and expense of keeping for three months, from the 20th March to the 20th of June, were as follows:

	Incr. in lbs.	*Expense.*
Three heifers on raw turnips,	392	£6 18 0
" on steamed turnips,	532	8 18 0
" on raw potatoes,	600	10 7 0
" on steamed potatoes,	572	10 7 0
Three steers on raw potatoes and corn, - -	722	9 4 0
" on boiled potatoes and corn, - -	689	9 5 0

John Baswell fed ten horned cattle. The expense of keeping the five cattle on raw food was £32 2 1, while that of the cattle on prepared food was £34 5 10. On being slaughtered the two lots appeared to be very similar, but the particular weight is not mentioned·

3. *Relative economy of feeding with turnips alone, or with turnips and other more expensive food.*

Robert Stevenson was the successful competitor for the society's premium. He took 18 oxen; their live weight was ascertained at the beginning, at the end, and at intermediate periods of the experiment, which continued 119 days. The cattle were divided into three lots of six beasts each, and a correct account was kept of the weight of food consumed by each lot. Lot 1, was allowed linseed cake, bruised beans, and bruised oats, in addition to turnips, and during the last 24 days of the experiment, 20 lbs. of potatoes were given per day to each. Lot 2, received the same allowance except the linseed cake and half the potatoes. And lot 3, was fed upon turnips alone. The cost of the keep of each animal, during the 119 days, was as below:

Total cost of feeding one beast of lot 1,	£5 2 7
do do do of lot 2,	3 17 0
do do do of lot 3,	1 18 7½

The improvement in live weight was as follows:

First lot increased in weight			108 stone.
Second	do	do	101 "
Third	do	do	49 "

Abstracting the cost of feeding from the value of the increased weight, the loss and profit would stand as follows:

Loss on feeding lot 1, - -	£3 15 8¾
Profit on feeding lot 2, - -	1 19 3½
Profit on feeding lot 3, - -	2 11 1

"Thus, when turnips alone were used, a profit of twenty-two per cent was realized; where beans and oats were used along with the turnip, the profit was diminished to eight and a half per cent; but when still more expensive food was tried, that is, grain and linseed cake, along with turnips and potatoes, a loss was sustained of no less than 12 3—16 per cent."

Lot 1, were the largest oxen. They were fed each with 132 lbs. per day of Swedish turnips; lot 2, were fed each with 120 lbs. of the same per day; and lot 3, being the smallest, received but 115 lbs. per day, and for twenty-four days, but ninety-two pounds.

Lot 1,	cost 4,484	pence	for every	lb. of increased live weight.
Lot 2,	" 3.92	"	"	"
Lot 3,	" 3.39	"	"	"

The turnips were estimated at four pence per cwt; the potatoes at 1*s*. 6*d*. per cwt.; oats and beans at 3*s*. 6*d*. per bushel, and linseed cake at three-fourths of a penny per pound.

"In conclusion" says Mr. Stevenson, "on this part of the subject, "we give it as our opinion, that whoever feeds cattle on *turnips alone*, will have no reason on the score of profit, to regret their not having employed more expensive auxiliaries to hasten the fattening process."

It would seem pretty evident, from the forgoing experiments, that ruta baga and mangel wurtzel are the best root crops for feeding cattle. The profit of cultivating and feeding these roots will be more manifest, if we compare their acreable product with that of hay, potatoes, and the coarse grains which we feed for fattening animals. To enable the committee to make this comparison, they assume the following as the average products of crops, and attach to each of these an estimate of their marketable value. Both the product and the prices will greatly vary; but those assumed are deemed sufficiently correct for comparison.

An acre of grass,	2 tons at	$10		$20 00
do corn,	40 bush. at	75 cts.		30 00
do oats,	30 do at	37½	"	11 20
do buckwheat,	30 do at	50	"	15 00
do potatoes,	150 do at	25	"	37 50
do ruta baga,	600 do at	25	"	150 00
do man. wurt.	600 do at	25	"	150 00

Estimating the cost of the roots in labor, at twenty dollars an acre more than that of the hay, oats and buckwheat, it still leaves a great disparity in the profits; and considering the cost of culture equal to that of Indian corn, there is a manifest advantage in the turnips and mangel wurtzel over the corn-crop, as a material for cattle food. Good beef cannot be made on hay alone, in winter; and those who do not feed roots, must resort to some more expensive food, as the meal of Indian corn, oats, buckwheat, &c. The turnips and mangel wurtzel, on the contrary, with the aid of perhaps a little straw, will serve themselves to feed and fatten animals.

In this matter the chairman can speak from experience. He purchased four oxen a little before Christmas, and kept till some time in April; after a short time, they ate each two bushels a day of ruta baga—they would eat very little else, though laid before them, not even linseed cake. They made good beef, and afforded a handsome profit on the turnips consumed.

If we now assume that an ox will require a quarter of a hundred of hay per diem to keep him in good condition, and that it will require an addition of four quarts of corn-meal, or eight quarts of chrushed oats of buckwheat, per diem, to fatten him; and if we consider 112 pounds or two bushels of roots equivalent to a ration of hay and grain, then the several crops will feed an animal as below.

One acre of grass, and half an acre of corn will feed - - - - -	160 days.
One and a half acres of mangel wurtzel, or Swedish turnips, will feed -	450 days.
One acre of grass, and one acre of oats or buckwheat, will feed - -	160 days.
Two acres of Swedish turnips or mangel wurtzel will feed - -	600 days.
One acre of potatoes will feed -	75 days.
One acre of Swedish turnips or mangel wurtzel will feed - - -	300 days.

Making very liberal allowance for the difference in the expense of raising these crops, and for any error the committee may have made in fixing the daily rations, or in the acreable produce of each, they think that no doubt can for a moment be entertained that the Swedish turnip and the mangel wurtzel are decidedly the best crops that can be raised for feeding and fattening cattle.

The committee have no doubt that the sugar beet and the carrot offer advantages nearly or quite equal to the roots above recommended. Their product and nutriment properties are very similar, and the expense of culture is not very dissimilar. The sugar beet is probably richer in nutriment than the mangel wurtzel, though its product is ordinarily less. The carrot may require more labor in the culture; but it is superior as food, particularly for horses.

Arthur Young highly extols the carrot. Upon the product of three acres of this root, he assures us, he kept for more than five months, twenty work horses, four bullocks, and six milch cows; nor did the animals, during that period, he adds, taste any other food, except a little hay. Our enterprising fellow-citizen, Col. Meacham, of Oswego, has gone largely into the culture of carrots, as cattle feed, as well as many of his neighbors; and they speak highly of the profits of the culture.

Some highly satisfactory experiments have also been made among us, on a limited scale, in cultivating and feeding the sugar beet. There seems to be little doubt, from the high state of perfection and of profit, which the business has arrived at in France and Germany, that the culture of this beet will soon be extensively gone into in this country, for the purpose of making sugar; and if so, the residuum of the beet will form an important item in the material for fattening cattle.

There are other advantages resulting from root-culture which should not be overlooked. It tends greatly to increase the quantity of manure on the farm, to meliorate the texture of the soil, and to furnish excellent alternating crops in convertable husbandry. In selecting for culture, the farmer should chose the roots that are best adapted to his soil. The turnips prefer a dry sandy soil; the beet a clay loam.

As to the best means of cultivating these crops, the committee summarily remark, that the product and profit will materially depend upon the following contingencies, viz: that the soil be dry; that it be rich; that it be deeply worked; that it be well pulverized; and that the after-culture be well managed. The implements necessary to cultivate them advantageously, in addition to the plough and harrow, are the drill-barrow and cultivator. The season for sowing the beet is from the 10th to the 20th May; of sowing the Swedish turnip, from the 10th to the 25th June. The drill or row-culture is decidedly the best. A detail of the whole process of culture would occupy too much space for this report, and is unnecessary, as these processes are already understood by many, and have been minutely described in the agricultural periodicals of the day. The committee will merely recommend in conclusion, that the roots be always cut, previously to being fed to cattle, for which machines may be procured, at a moderate charge, which will cut a bushel in one to three minutes. If cut, the roots are eaten entirely: if not cut, a portion is apt to be rejected and wasted.

The chairman has received a communication from Col. Meacham, stating his mode of cultivating carrots, the product, and manner of using the crop. He cultivates them in drills, from 20 to 24 inches apart--he gets one thousand bushels an acre, at an expense of $25 to $30; he kept six work horses on them from Nov. 1836 to June 1837, without grain, and they remained in good plight, and performed as well as he ever had horses to perform—and he thinks they are worth double as much for stock as ruta baga.

Upon the subject of the carrot-culture, which is perhaps less understood among us than that of the beet and turnip, the committee will add, that this root thrives best in a sandy loam, light, moist, but not wet, and of great depth; in which the plough, going to the beam, brings to the surface nothing that is not fit for vegetation. The ground should be ploughed immediately preceding the sowing. In Suffolk, Eng., they sow 8 lbs. seed,

broadcast, to the acre; and the crop is from 400 to 500 bushels. To horses they are considered superior to any other food. Two bushels of carrots and one of chaff is the per diem allowance to a horse; or 7 bushels of carrots and one bushel of oats is the allowance for a week. They are also profitably fed to all other farm-stock. They are raised in Suffolk without dung, at an expense of 9*d.* (16 cents) per bushel. The yield of the carrot is often 700 to 1000 bushels the acre. The crop is gathered by making a deep furrow near to the drill, when a man seizes, draws the top to the furrow, and pulls them up with great facility.

Another root, the parsnip, is deserving of notice, though its partial culture hitherto, will hardly entitle it to be classed among field crops. It is believed to be the most nutritious root of any that have been named; is as easy cultivated as the carrot or the beet; and has this advantage over all the others, that its value is not impared by frost.

From the preceding views, the committee do not hesitate to recommend the extention of root-culture, as the most ready means of keeping up the fertility of our farms, and of increasing the profits of their cultivation. J. BUEL, *Ch'n.*

ALLEGED EFFECT OF SLAVERY ON THE AGRICULTURE OF VIRGINIA.

To the Editor of the Farmers' Register.

Portsmouth, Va., April 1, 1839.

You have indeed, from all accounts, a vast and fine tract of country, from 60 to 80 miles broad along the whole Atlantic coast. This vast country is now, in a good measure, a desert, or covered with forests—the land ruined by continual cropping, and now deserted. Good lands, as I am told, may now be obtained in this vicinity for from $5 to $8 an acre, in part covered with a young and luxuriant growth. We know the causes of this destruction; and these same causes continuing, it seems not very probable that these lands will ever again be recovered, or rise in value until those causes are removed.

It appears to me that the soil answers well to the description of the soil of Flanders, which is said to be, now, the garden of the world, though formerly it was very poor; and I am fully satisfied that the whole of eastern Virginia, with suitable management, by clearing and draining, may become, one day, not only the most healthy country, but the garden of all the Atlantic states. The lands in this vicinity, as far as I have seen, appear to be at least as fertile as any of those lands of Massachusetts, which now bring $100 an acre. Larger crops by far, as I am fully convinced, may be obtained from these lands, at far less expense than are obtained on many of the best lands in Massachusetts.

Your state contains, as I believe, 44,000,000 acres of land, and, I am satisfied, capable of sustaining a population of from 8 to 10,000,000. Your treasures of calcareous manures, for the renovation of these lands, are inexhaustible, and are profusely scattered over the whole country, far and wide. This is not the case in a very considerable portion of New England. But one great objection with many of our northern men to a permanent residence in this country, is the state of slavery that here exists. For slavery in Virginia not only has a tendency to lower and degrade the wages of the free laborer, but to degrade also the profession. It is not thus in New England, but the reverse—idleness being deemed in that country a vice, and useful labor honorable in all. This state contains about 500,000 slaves, which are probably valued by their owners, one with another, at $400 each, or $200,000,000, for the whole. Now, can any one doubt but that if all these slaves were emancipated, that the lands of Virginia would rise $5 an acre, and this rise of $5 an acre would be equivalent to the estimated value of all the slaves. I am persuaded, however, that the rise of lands would be far greater; and that, were all the slaves emancipated at this day, the state of Virginia would experience a clear gain of more than $500,000,000 in the rise of their lands alone. Emigration would then take place to a great extent from the northern *free states*. The Yankees would then flock hither, and hire up at advanced wages the freed slaves, and the whole of eastern Virginia would then become a perfect garden. The advantages of this part of Virginia for the production, especially of all *early vegetables* and *fruits* for the supply of the markets of the great cities of the northern and middle states, is very great, and unrivalled; as these cities, by the aid of rail-roads, and steam navigation, will soon be brought within 24 hours of Norfolk; yet the seasons are at Portsmouth full a month in advance of some of these northern cities. The wheat of lower Virginia almost always commands a higher price than that of the north, new flour being preferred by all. The fields of Virginia may be reaped and the produce converted into flour, and this flour for sale at New York and Boston, even before the wheat fields of the north are ready to harvest.

Although the prices of provisions are generally at least as low in this part of Viginia, and the price of labor much lower than in New England, yet I am inclined to believe that this difference in regard to wages is rather nominal than real; since the expenses of fare and of entertainment to the traveller are far greater on the main travelling routes of the south, so far I have seen, than they are in New England. I am persuaded that the people of Virginia will never be able to compete with their brethren of the less highly favored land of New England, either in agriculture, or manufactures, or commerce, until some great change, under providence, can be brought about in the political condition of their people.

I have written to some of my northern friends, and aver that an experienced northern farmer might here make a great fortune suddenly in the cultivation of *early* productions for northern markets, which there command a most extravagant price. Your horses and cattle are generally lean and poor; but this, I am confident, is owing not to climate, but to want of shelter and bad keeping, want of attention and care. My horses, from Baltimore, owing to good care of my Yankees, are in the finest possible condition; so those of the Navy-yard here, although I am told some of those horses are now old. Very respectfully,

WILLIAM KENRICK.

EDITORIAL REMARKS.

All of our northern readers, as well as some of those in the southern states, may be surprised that

the foregoing condemnation of slavery should have been admitted to our pages. The former, probably, suppose that southern men and slave-holders fear, and therefore object to, the expression of opinions contrary to their own on this subject; and many in the south, in their violence against northern anti-slavery fanaticism, show themselves to be as bigoted and fanatical in opposition, and are disposed to regard any expression of such opinions as both insulting and designing injury to themselves. But we are not of this class. Maintaining as we do, and as staunchly as any can do, the rights of slave-holders, both private and political —maintaining too, that the institution of personal slavery, under certain circumstances, (and which are in full operation in the greater part of the southern states,) is politic, and proper in itself—maintaining too, that the institution, in general, has been highly beneficial to the world, in increasing labor, wealth, civilization, and refinement, and even in spreading good morals and religion—still, we neither object to others considering these opinions as altogether erroneous, nor to their endeavoring, by argument and evidence, to sustain their opposite opinions. Domestic or personal slavery, even upon our own view, like every other widespread and widely operating institution, has its evil as well as its good effects; and in regarding it, perhaps we may allow too little weight to the former, and too much to the latter—just as we deem that our northern correspondent errs in the opposite manner. But no matter how erroneous may be his views, and those of his countrymen in general, on this subject, it is always well for us to learn and know the opinions of intelligent and observing strangers concerning what they may suppose to be both the good and the evil of our agricultural condition. Their correct views will do us good—the incorrect will certainly do us no harm.

Mr. Kenrick is is a nursery-man of extensive business near Boston, and the author of several agricultural and horticultural works, (the 'American Orchardist,' 'American Silk-Grower's Guide,' &c.) Until receiving the foregoing letter, the last correspondence which we had had with him occurred more than three years ago, when he wrote to ask our advice as to a then novel scheme of his, for establishing his nursery for the morus multicaulis in lower Virginia, instead of on his own land, and under his own personal direction, in Massachusetts. His inducement, stated in his letter, was that he knew that the growth of the multicaulis of one season in our climate, was equal to that of three, or perhaps more seasons in Massachusetts. We concurred in his views, urged his carrying them through, and gave such information as could be offered in aid of his plan. But we further urged on him to extend it to the establishment of silk-culture in Virginia, and gave such views for it, as have been often stated in the Farmers' Register, as sufficient inducements to invite northern silk-culturists to settle here. As a stronger inducement for an establishment, which we even then thought so desirable, both for public and private interests, in Virginia, we offered, in the same letter, to sell to him, or to a company formed for the purpose of making silk, a marled farm of 600 acres of land, and to vest the purchase money in the joint stock of the adventurers. We quote from memory, but believe with no material variation from the substance of the letters; and the opinions then so expressed, and the investment which we were then (in advance of all other adventurers in Virginia) ready to make in silk-culture, *if some practical and experienced culturists would undertake the management*, may serve as strong proof, in addition to others of another kind recently adduced, that we have long and earnestly advocated the advantages of silk-culture in this region, and would have risked much of our property on the soundness of that opinion. It should be observed, that at that time no one anticipated the multicaulis speculation, and the enormous prices which have since been obtained—or counted on profits from so strange a circumstance. For our own part, we had not then the slighest expectation of ever selling a plant from the silk-farm then proposed to be established; and Mr. Kenrick, in his scheme, probably counted on merely making the usual sales and profits of that branch of his general nursery business, to be increased in product and amount, however, by his availing of our more genial climate. To that operation he limited his following of our advice; and though at the end of two years, he sold plants (as we have heard from other authority,) from a few acres of land near Richmond, for $30,000, that enormous profit was a result beyond all previous calculations, and for which we claim no credit in having encouraged the scheme by our advice. As we failed in inducing the commencement of silk-culture as the main object, we cared nothing about the mulberry culture alone; and did not then set out a single plant, nor until a year afterwards, when it was caused by accident, and not by design, or by calculations of profit.

It was under these circumstances that Mr. Kenrick became a cultivator to some extent in Virginia, though still continuing a resident of Massachusetts; and we have thought that the statement, though a digression, might be interesting and useful, as exhibiting, in a strong light, the practical proof of the superiority of our climate. For the adventurer has not only labored under all the

disadvantages of remote residence, but also under those caused by his prejudices against the facilities offered by our cheapest and best labor.

Mr. Kenrick is altogether mistaken as to slavery being the cause of the admitted agricultural degradation of the fine region near Portsmouth and Norfolk, and, in a less degree, that of lower Virginia generally. The holding of slaves doubtless in some manure helps to produce the general result, just as the facilities for comfort, ease, and rich products of land and labor, so abundantly offered to our countrymen by other circumstances, all tend to lessen exertion, and to make us indolent and careless. This is but according to the nature of man; and if there were not a slave in Virginia, there would still be so much more ease in acquiring the bare necessaries of life (and, on the seaboard, many of its luxuries also,) that our people would, in labor and frugality, still be far behind the crowded people of Massachusetts, who, on a rocky and barren soil, and under a rigorous climate, must both toil and save incessantly—or starve. It is because necessity does not drive, that perhaps *on no one farm in Virginia* is there so much economy of means, and of expenditure, as is *general in the north*. But in other respects, there is as well planned, and as skilfully executed agricultural practice, and altogether *far better farming*, in Virginia, than in Massachusetts. It is true that *good farming* is rare here; and so it is elsewhere. But it will surprise Mr. Kenrick to be informed that our best farming in lower and middle Virginia is always to be found in connection with, and absolutely dependent on, the most complete establishment and entire use of slave labor. We could name many farms in Virginia, of which the skilful and excellent cultivation, the system of improvement, and the general management, could not be deemed otherwise than admirable, even to a New Englander the most intolerant of and prejudiced against slavery; and we may add, though not bearing on our proposition, that these are generally the places where the comforts of the slaves are best cared for, and their condition is better than that of ninety-nine-hundredths of the free laborers throughout all other parts of the world. It may be true, on each one of these our very best cultivated and best managed farms, that a Yankee might pick up a comfortable income, and means for maintenance, in the matters regularly and continually wasted, and totally lost. But it may also be said, that without the cultivation and returns being very good, and there being much profit actually made, so much waste and loss could not be afforded. Even with all our admitted faults of system, and of execution, we feel assured, from such information as we have, that there are many farmers in Virginia who deserve to rank in their profession at least as high, if not higher, than the best in New England. Still, we yield the palm, and freely award the praise, to these our northern brethren, of greater economy in every thing, comprehending better habits of labor, and of frugality. But this latter difference, and superiority on their part, are owing to the difference of other circumstances--the greater pressure of necessity in the one case than the other, and not to the existence or absence of slavery. Nor do we mean to under-rate these highly valuable elements of agricultural success. On the contrary, we have continually admitted and applauded the superior merits of our northern countrymen in these respects, and recommended their example to be better followed here.

There are many circumstances which have concurred to depress the agriculture of Virginia, which we will not here stop to rehearse; and there is no part of the state where agricultural skill and products are lower, compared to the great natural advantages of the lands, than in the region in which Mr. Kenrick is now cultivating, and to which he more especially refers, in these respects. And if a number of his more industrious and frugal countrymen will come among us, and avail of the advantages which ours' so much neglect, we are confident that, either with the benefit, (or incumbrance, if so considered,) of slaves, or without, that they can even now make far greater agricultural profits than any where in New England.

If the capabilities of an agricultural region are to be estimated by its *worst* instead of its *best practices*, we might, perhaps, find even in Massachusetts, subjects for condemnation as great as any in Virginia; and grounds on which to pronounce the northern people as deficient as any elsewhere, in system, in judgment, and even in their peculiar and acknowledged merits of provident foresight and economy. We will quote, for example, a passage copied from the Survey of Berkshire by the Agricultural Commissioner of Massachusetts, which has just been published, and from which excellent report we shall copy sundry items of *good* husbandry, with much more gratification than we thus present defects for comparison and illustration.

"Yet with all this it must be admitted that the agriculture of the county in extent and productiveness is far below what it should be. As well as I could learn, Egremont is almost the only town in the county, which raises not only its own bread, but has some for exportation. Vast amounts of flour, grain of various kinds, pork and dairy produce are brought into the county from the neighboring states of New York and Vermont. It was asserted as a fact, and if so, it deserves notice, that two years since some families in one of the best towns in the county were without bread of any kind for a time, from the impossibility of obtaining it. They were persons for example

who worked for the large wool-farmers. They asked for money for their labor; but money was not to be had, because the clipping of wool, owing to the derangements of business, had not been sold. They asked to receive their pay in grain; but the wool-farmers had abandoned all cultivation for the sheep husbandry. They asked for their pay in pork, but the farmers who raised no grain could raise no pork. Now whether this be a true history, or fabulous, it illustrates clearly the error committed in abandoning the production of grain."—*Second Report of the Agriculture of Massachusetts.*

If these facts had been stated, by a northern traveller, of a *cotton* instead of a *wool-growing* region, and of *slaves* instead of *free laborers*, what would have been the measure of severity of comment, both on the improvidence and the inhumanity of the farmers!

EXTRACTS FROM THE OLD LAWS AND RECORDS OF VIRGINIA.

(Continued from page 183.)

Sir William Berkeley's account of Virginia, in 1671.

The next extract presented, will be the entire copy of the "Enquiries to the Governor of Virginia, submitted by the Lords Commissioners of Foreign Plantations, with the Governor's answers to each distinct head." Hening says of this paper, that "a more correct statistical account of Virginia, at that period, cannot perhaps any where be found. The answers appear to have been given with great candor, and were from a man well versed in every thing relating to the country." Sir Wm. Berkeley was for thirty six years governor of Virginia, by royal authority, and exercised the power during that whole time, except the short intervals when dispossessed, first by the establishment of the English commonwealth's rule, and afterwards by Bacon's rebellion. The governor was an admirable specimen of the loyal cavaliers of his time. His entire devotion to his monarch, and submission to the regal will, had nothing in it of the *mercenary motives*, or crawling servility, of a modern courtier, or even of many a *republican* office holder, or office seeker, of our own time and country. His loyalty was founded in principle; and mistaken as the principle was, and misdirected to the basest of kings, Charles II, the feelings and motives yet command our respect, as much as those of the stern puritans who stood on the extreme of opposite ground. Berkeley's loyalty was like that so admirably depicted by Scott in the character of Claverhouse. Even amidst his expressions of loyal devotion to royalty in these answers, there may be discovered a proud and stern bearing, and scorn, which he scarcely cared to repress, for the measures of misrule. But, bold and free as was the old cavalier in expressing disapprobation of the foolish and injurious policy of the royal authority, still, in his eyes there were no crimes so black as disloyalty and rebellion; and the implacable vengeance with which, a few years afterwards, he pursued, and the cruelty with which he punished, the participators in Bacon's most noble (and for a short time, successful) resistance to the galling despotism of the royal government, were doubtless deemed by Berkeley to be strictly required by his duty, not only as a governor, but as a man and a christian. Under the influence of noble feelings and impulses thus unfortunately perverted, after the suppression of the rebellion, he caused the blood of the actors to be "poured out like water;" and considering the small amount of population of the colony, (which then had existed but 70 years,) perhaps in no country, under like circumstances, was the vengeance of the law more unsparingly and bloodily inflicted. Yet Governor Berkeley, who urged on and carried through these acts of cruelty and legal murder, doubtless considered his course as necessary and as praise-worthy, as if he had been engaged in exterminating ferocious or predatory wild beasts. With all this, Berkeley was just the man who, under different training, would have made one of the purest and sternest of republicans. The same materials (and they are of the most superior kind,) which were fashioned by education into a Berkeley, or a Claverhouse, would, under different circumstances, have made a Cato, a Pym, or a Carnot.—Ed. F. R.

Enquiries to Governor Berkeley, and answers.

1. What councils, assemblies, and courts of judicature are within your government, and of what nature and kind?

Answer. There is a governor and sixteen counsellors, who have from his sacred majestie, a commission of *Oyer and Terminer*, who judge and determine all causes that are above fifteen pound sterling; for what is under, there are particular courts in every county, which are twenty in number. Every year, at least, the assembly is called, before whom lye appeals, and this assembly is composed of two burgesses out of every county. These lay the necessary taxes, as the necessity of the war with the Indians, or their exigencies, require.

2. What courts of judicature are within your government relating to the admiralty?

Answer. In twenty-eight yeares there has never been one prize brought into the country; so that there is no need for a particular court for that concern.

3. Where the legislative and executive powers of your government are seated?

Answer. In the governor, council and assembly, and officers substituted by them.

4. What statute laws and ordinances are now made and in force?

Answer. The secretary of this country every

year sends to the lord chancellor,* or one of the principal secretaries, what laws are yearly made; which for the most part concern only our own private exigencies; for, contrary to the laws of England, we never did, nor dare make any, only this, that no sale of land is good and legal, unless within three months after the conveyance it be recorded in the general court, or county courts.

5. What number of horse and foot are within your government, and whether they be trained bands or standing forces?

Answer. All our freemen are bound to be trained every month in their particular counties, which we suppose, and do not much mistake in the calculation, are near eight thousand horse: there are more, but it is too chargeable for poor people, as we are, to exercise them.

6. What castles and fforts are within your government, and how situated, as also what stores and provisions they are furnished withall?

Answer. There are five fforts in the country, two in James river, and one in the three other rivers of York, Rappahannock and Potomeck; but God knows we have neither skill or ability to make or maintain them; for there is not, nor, as far as my enquiry can reach, ever was one ingenier in the country, so that we are at continual charge to repair unskilfull and inartificial buildings of that nature. There is not above thirty great and serviceable guns; this we yearly supply with powder and shot as far as our utmost abilities will permit us.

7. What number of priviteers do frequent your coasts and neighbouring seas; what their burthens are; the number of their men and guns, and the names of their commanders?

Answser. None to our knowledge, since the late Dutch war.

8. What is the strength of your bordering neighbours, be they Indians or others, by sea and land; what correspondence do you keep with your neighbours?

Answer. We have no Europeans seated nearer to us than St. Christophers or Mexico that we know of, except some few ffrench that are beyond New England. The Indians, our neighbours are absolutely subjected, so that there is no fear of them. As for correspondence, we have none with any European strangers; nor is there a possibility to have it with our own nation further than our traffick concerns.

9. What arms, ammunitions and stores did you find upon the place, or have been sent you since, upon his majestyes account; when received; how employed; what quantity of them is there remaining, and where?

Answer. When I came into the country, I found one only ruinated ffort, with eight great guns, most unserviceable, and all dismounted but four, situated in a most unhealthy place, and where, if an enemy knew the soundings, he could keep out of the danger of the best guns in Europe. His majesty, in the time of the Dutch warr, sent us thirty great guns, most of which were lost in the ship that brought them. Before, or since this, we never had one great or small gun sent us, since my coming hither; nor, I believe, in twenty years before. All that have been sent by his sacred majesty, are still in the country, with a few more we lately bought.

10. What monies have been paid or appointed to be paid by his majesty, or levied within your government, for and towards the buying of armes, or making or maintaining of any ffortifications or castles, and how have the said monies been expended?

Answer. Besides those guns I mentioned, we never had any monies of his majesty towards the buying of ammunition or building of fforts. What monies can be spared out of the publick revenue, we yearly lay out in ammunition.

11. What are the boundaries and contents of the land, within your government?

Answer. As for the boundaries of our land, it was once great, ten degrees in latitude, but now it has pleased his majesty to confine us to halfe a degree.* Knowingly, I speak this: Pray God it may be for his majesty's service, but I much fear the contrary.

12. What commodities are there of the production, growth and manufacture of your plantation; and particularly, what materials are there already growing, or may be produced for shipping in the same?

Answer. Commodities of the growth of our country, we never had any but tobacco, which in this yet is considerable, that it yields his majesty a great revenue; but of late, we have begun to make silk, and so many mulberry trees are planted, and planting, that if we had skilfull men from Naples or Sicily to teach us the art of making it perfectly, in less than half an age, we should make as much silk in an year as England did yearly expend three score years since; but now we hear it is grown to a greater excess, and more common and vulgar usage. Now, for shipping, we have admirable masts and very good oaks; but for iron ore, I dare not say there is sufficient to keep one iron mill going for seven years.

13. Whether salt-petre is or may be produced within your plantation, and if so, at what rate may it be delivered in England?

Answer. Salt-petre, we know of none in the country.

14. What rivers, harbours or roads are there in or about your plantation and government, and of what depth and soundings are they?

Answer. Rivers, we have four, as I named before, all able, safely and severally to bear an harbour a thousand ships of the greatest burthen.

15. What number of planters, servants and slaves; and how many parishes are there in your plantation?

Answer. We suppose, and I am very sure we do not much miscount, that there is in Virginia above forty thousand persons, men, women and children, and of which there are two thousand *black slaves*, six thousand *christian servants*, for a short time, the rest are born in the country or have come in to settle and seat, in bettering their condition in a growing country.

16. What number of English, Scots, or Irish have for these seven yeares last past come yearly to plant and inhabite within your government; as

* By an order of the Lords Commissioners for foreign plantations, made in 1679, it is made the duty of the clerk of the assembly to send them a copy of the journal and laws of each assembly.

* This must allude to the eastern boundary, on the sea shore.

also what *blacks* or *slaves* have been brought in within the said time?

Answer. Yearly, we suppose there comes in, of servants, about fifteen hundred, of which, most are English, few Scotch, and fewer Irish, and not above two or three ships of negroes in seven years.

17. What number of people have yearly died, within your plantation and government for these seven years last past, both whites and blacks?

Answer. All new plantations are, for an age or two, unhealthy, till they are thoroughly cleared of wood; but unless we had a particular register office, for the denoting of all that died, I cannot give a particular answer to this query, only this I can say, that there is not often unseasoned hands (as we term them) that die now, whereas heretofore not one of five escaped the first year.

18. What number of ships do trade yearly to and from your plantation, and of what burthen are they?

Answer. English ships, near eighty come out of England and Ireland every year for tobacco; few New England ketches; but of our own, we never yet had more than two at one time, and those not more than twenty tuns burthen.

19. What obstructions do you find to the improvement of the trade and navigation of the plantations within your government?

Answer. Mighty and destructive, by that severe act of parliament which excludes us the having any commerce with any nation in Europe but our own, so that we cannot add to our plantation any commodity that grows out of it, as olive trees, cotton or vines. Besides this, we cannot procure any skilfull men for one now hopefull commodity, silk; for it is not lawfull for us to carry a pipe stave, or a barrel of corn to any place in Europe out of the king's dominions. If this were for his majesty's service or the good of his subjects, we should not repine, whatever our sufferings are for it; but on my soul, it is the contrary for both. And this is the cause why no small or great vessells are built here; for we are most obedient to all laws, whilst the New England men break through, and men trade to any place that their interest lead them.

20. What advantages or improvements do you observe that may be gained to your trade and navigation?

Answer. None, unless we had liberty to transport our pipe staves, timber and corn, to other places besides the king's dominions.

21. What rates and duties are charged and payable upon any goods exported out of your plantation, whether of your own growth or manufacture, or otherwise, as also upon goods imported?

Answer. No goods, either exported or imported, pay any the least duties here, only two shillings the hogshead on tobacco exported, which is to defray all public charges; and this year we could not get an account of more than fifteen thousand hogsheads, out of which the king allows me a thousand* yearly, with which I must maintain the port of my place, and one hundred intervening charges that cannot be put to public account. And I can knowingly affirm, that there is no government of ten years settlement, but has thrice as much allowed him. But I am supported by my hopes, that his gracious magesty will one day consider me.

22. What revenues doe or may arise to his majesty within your government, and of what nature is it; by whom is the same collected, and how answered and accounted to his majesty?

Answer. There is no revenue arising to his majesty but out of the quit-rents; and this he hath given away to a deserving servant, Col. Henry Norwood.

23. What course is taken about the instructing the people, within your government in the christian religion; and what provision is there made for the paying of your ministry?

Answer. The same course that is taken in England out of towns; every man according to his ability instructing his children. We have fforty-eight parishes, and our ministers are well paid, and by my consent should be better, *if they would pray oftener and preach less.* But of all other commodities, so of this, *the worst are sent us*, and we had few that we could boast of, since the persecution in *Cromwell's* tiranny drove divers worthy men hither. But, I thank God, *there are no free schools* nor *printing*, and I hope we shall not have, these hundred years; for *learning* has brought disobedience, and heresy, and sects into the world, and *printing* has divulged them, and libels against the best government. God keep us from both!

[The same hostility to the introduction of *printing* which was manifested by Sir. William Berkeley, was shown by Lord Culpeper, who was governor of Virginia in 1683, only *eleven years* after these principles were avowed by Sir William Berkeley. It will be seen by the following extract, which is from a MS. of unquestionable authority, that at last mentioned date, a printer had actually commenced his business in Virginia, but was prohibited by the governor and council from *printing any thing*, till the king's pleasure should be known; which, it may be presumed was very tardily communicated, as the first evidence of printing thereafter in Virginia was on the revised laws contained in the edition of 1733.

"February 21st, 1682, John Buckner called
"before the Lord Culpepper and his council for
"printing the laws of 1680, without his excellen-
"cy's licence, and he and the printer ordered to
"enter into bond in £100 *not to print any thing*
"thereafter, until his majesty's pleasure should be
"known."] *(Bland MS. pa. 498.)*

* He means £1000 sterling money; which was the stated salary of the governor; besides which the assembly allowed Sir William Berkeley, who is here speaking, an additional salary of £200.—*Hening*

From the Magazine of Horticulture.

ON THE CULTIVATION OF BRUSSELS SPROUTS.

The Brussels sprouts are highly prized throughout Europe, as a culinary vegetable. Therefore it is grown as extensively as any of the brassica or cabbage tribe. The appearance of the plants is more like the Savoy cabbage than any other variety, with this difference—the stems grow to the height of three or four feet, and are closely set from the bottom to the top, with sprouts like small cabbages in miniature; each being from an inch to two inches in diameter.

The plants are raised from seed sown in April or May, an ounce of which, if good, will be sufficient to sow a bed four feet wide by ten in length. If the seed is sown in April, (which would be the best method,) on a slight *hot-bed*, under glass, the plants will be ready for the final transplanting by the second or third week in May. Select a piece of ground for this purpose, that is in good heart, and where the soil is deep. The plants need not be set out more than eighteen inches apart *each way*, as the head does not spread like a Savoy, and the leaves drop off before the sprouts are ready for gathering, which will be by the first of October. The tops or heads ought to be cut off *two or three weeks* before the sprouts are gathered for use.

The whole treatment, as to the cultivation and management, is precisely the same as the Savoy cabbage. In November, or before the ground freezes hard, the plants might be taken up, and planted in earth in a cellar, pretty close together, and would be found to be an excellent vegetable through the winter. J. W. RUSSELL.

Mount Auburn, Cambridge, March 8, 1839.

COMPARATIVE COST OF HAY, ROOTS, &c. FOR FEEDING STOCK.

Extract from the Address of Rev. H. Colman, Commissioner of the Agricultural Survey of Massachusetts.

"I wish briefly to draw the attention of Farmers to the value of hay, compared with other crops, for the feeding of stock. An acre of hay yields one ton and a half of vegetable food. An acre of carrots, or Swedish turnips, will yield from ten to twenty tons; say fifteen tons, which is by no means an exaggerated estimate. It has been ascertained by experiment, that three working horses, fifteen and a half hands high, consumed at the rate of two hundred and twenty-four pounds of hay per week, or five tons one thousand and forty-eight pounds of hay per year, besides twelve gallons of oats each per week, or seventy-eight bushels by the year. An unworked horse consumed at the rate of four and one-quarter tons of hay in the year. The produce, therefore, of nearly six acres of land is necessary to support a working horse by the year; but half an acre of carrots, at six hundred bushels to the acre with the addition of chopped straw, while the season for their use lasts, will do as well if not better. These things do not admit of doubt. They have been subjects of exact trial.

"It is believed that the value of a bushel of Indian-corn in straw and meal, will keep a healthy horse in good condition for work a week. An acre of Indian-corn which yields sixty bushels will be ample for the support of a horse through the year. Let the farmer, then, consider whether it be better to maintain his horse upon the produce of half an acre of carrots, which can be cultivated at an expense not greatly exceeding the expense of half an acre of potatoes, or upon half an acre of ruta baga, which can be raised at a less expense than potatoes, or upon the grain produce of an acre of Indian-corn, or, on the other hand, upon the produce of six acres of his best land in hay and grain; for six acres will hardly do more than to yield nearly six tons of hay and seventy-eight bushels of oats. The same economy might be successfully introduced into the feeding of our cattle and sheep.

"These facts deserve the particular attention of the farmers who are desirous of improving their pecuniary condition. It is obvious how much would be gained by the cultivation which is here suggested; how much more stock would be raised, how much the dairy produce might be increased; and how much the means of enriching the land, and improving the cultivation, would be constantly extending and accumulating. But when we find on a farm of two hundred acres, that the farmer cultivates only two acres of potatoes, one acre of ruta baga, and perhaps a quarter of an acre of carrots, we call this "getting along," in the common phrase, but we can hardly dignify it with the name of farming. I am aware that labor of a proper kind is in many cases difficult to be procured, and with our habits, as difficult to be managed. Farming, likewise, can in few situations be successfully managed, unless the farmer has capital to employ, equal at least, to one year's manure, and one year's crops. A large portion of our farmers, also from the nature of their habits and style of living, are so prosperous and independent, that they have no occasion to extend their cultivation beyond what it now is, in order to meet their wants; and to incur all the trouble, vexation, and risk of employing more labor, expending more capital, and increasing their cares."

TABLES OF SILK-WORM REARING.

The following tables will be found very useful, as well as interesting, to those who are just about to commence their noviciate in the new business of feeding silk-worms.

The two first tables, together with the observations and estimates annexed, are taken from the great work of Count Dandolo, the highest authority on this subject; and they exhibit the actual operations of the author for two successive years, one of which (1814) was especially unfavorable in the predominance of cold and wet weather. It will be seen that there were 26 rainy days out of 37, besides cloudy ones when no rain fell; and the temperature was low in proportion.

The third table is by Bonafous, another scientific and celebrated silk-culturist of Piedmont, and is founded principally on the work of Dandolo; though it directs wider spaces.

The temperature is marked by Fahrenheit's thermometer. The weights and measures of dimensions are French. The linear French foot (of 12 inches) exceeds ours, by three-fourths of a French inch; or 93.89 French feet, make 100 American. The French pound also exceeds the American as 1400 to 1281; that is, the quantity of 1281 lbs. of leaves required for the last age of feeding, as stated in the third table, is equal to 1400 lbs. American.

The prices stated are in Milanese money—the *livre (lira)* of 20 *sous (soldi)* being equal to 8*d.* sterling, or about 15 cents, American.—ED. F. R.

FIRST TABLE.—REARING of SILK-WORMS proceeding from Five Ounces of Eggs.

1813. Days of rearing.	Months.	Sorted Leaves given to the Silk-Worms.			Internal temperature.	External temperature.	ORSERVATIONS.
			lbs.	*oz.*	*degs.*	*degs.*	
1st Age							
Day 1	May 18		4	4	75	66	FIRST AGE.—The day of rearing begins after twelve o'clock afternoon.
2	19		6	0	75	64	
3	20	Leaves	12	0	75	66	Dry cold air.
4	21		6	4	75	66	The exterior temperature was at 62nd to 64th
5	22		1	8	75	62½	degree, to the west at 5 o'clock in the morning.
			30	0			
2nd Age							
Day 6	23		18	0	73½	64	
7	24	Small	30	0	73½	64	
8	25	branches	33	0	73	64½	SECOND AGE.—Fine weather. Dry air.
9	26	and leaves	9	0	73	66	
			90	0			
3rd Age							
Day 10	27		30	0	71½		THIRD AGE.—Little variation in the external temperature, south winds predominated, heavy air, rain.
11	28	Small	90	0	71½		
12	29	branches	97	8	71		The dry air experienced in the second age had imparted great vigor to the insects.
13	30	and	52	8	71		
14	31	leaves	30	0	71		
			300	0			
4th Age							
Day 15	June 1		0	0	71		
16	2		97	8	71		
17	2		165	0	69		FOURTH AGE.—Some silk-woms placed in a temperature of 64 degrees became torpid during fifty hours.
18	4	Small	225	0	69		
19	5	branches	255	0	69		
20	6	and	127	8	69		
21	7	leaves	30	0	69		
22	8		0	0	69		
			900	0			
5th Age							
Day 23	9		180	0	69		
24	10		270	0	69		
25	11		420	0	69		FIFTH AGE.—The season was extremely unfavorable from the 13th until the 18th of June. The thermometer placed in the west, stood during the 15th, 16th, and 17th as low as 53 degrees, at five o'clock in the morning. Cold rain almost uninterrupted, although the barometer did not indicate great moisture of atmosphere.
26	12	Small	540	0	68		
27	13	branches	810	0	68		
28	14	and	975	0	68		
29	15	leaves	900	0	68		
30	16		660	0	69		
31	17		495	0	69		
32	18		240	0	69		
5th Age			5490	0			
4th Age			900	0			
3rd Age			300	0			
2nd Age			90	0			
1st Age			30	0			
Sorted leaves			6810	0			

Weight of mulberry leaves, per ounce of eggs, 1609 pounds 8 ounces. The silk-worms proceeding from five ounces of eggs, which have consequently consumed 8047 pounds 8 ounces of leaf, produced 607 pounds 8 ounces of choice cocoons, and six pounds of coarse floss. About 20 pounds 1 ounce of leaves were consumed to a pound of cocoons.

1813. *Expenses incurred, and profit.*

	Milan livres.	Sous.
Dr.		
Five ounces of silk-worms' eggs,	15	0
Fuel-wood for hatching them,	1	15
82 quintals, or 80 cwts. of mulberry leaves, at 4 livres 13 sous, average price the quintal,	385	0
18 quintals 75 lbs. of shavings, thick wood and brushwood, at 1*l.* 1*s.* 4*d.* the quintal,	20	0
Boughs or broom to form the hedges for the worms to rise upon	18	0
Paper to put upon the wicker trays,	14	0
Oil for the lamps,	9	0
Fumigating bottle,	1	10
Expense of gathering the mulberry leaves, at the rate of 22 sous 8 dec. per quintal,	96	5
100 days men's labor, at 25 sous per day, women at 15 sous; when the men work extra hours at night they get 10 sous more, and the women 5 sous additional, altigether amounting to	103	10
Ground-rent, and interest of capital employed for purchase of trays, wicker, and other trifling articles,	90	0
Total,	754 Liv. M.	

Most of the paper and fagots of brooms may esrve for the following year.

Cr.

613 lbs. 8 oz. of cocoons were drawn from the laboratory, which, sold at 34 sous 6 dec., make about 1063 0

Net profit in favor of the person who has reared the worms on his own account, Liv. 309 8 s.

SECOND TABLE.—REARING OF SILK-WORMS *proceeding from five ounces of eggs.*

1814. Days of rearing.	Months.	Sorted Leaves.		Internal temperature.	External temp. at five o'clock in the morning, westerly.	Hygrometer of M. Bellani.	Weather.
					5 o'clock in the morning.		
			lbs. oz.	*degrees.*	*degrees.*		
1st Age							
Day 1	May 23		2 2	73 71	53	. . .	rain
2	24		3 9	71	48	. . .	rain and storm
3	25		4 9	71 69	44	. . .	rain and sun
4	26		8 0	69	46	. . .	clouds and sun
5	27		7 9	71	50	. . .	clouds
6	28		4 3	71½	55	. . .	rain
			30 0			*degrees.*	
2nd Age							
Day 7	29		8 10	71	48	68	rain
8	30	Small	16 8	71	53	70	fog and sun
9	31	branches	23 6	68	57	64	ditto
10	June 1	and	22 8	68	57	66	rain
11	2	leaves.	10 8	68	64	66	rain and sun
12	3		1 8	69	62	70	clouds
			83 0				
3rd Age							
Day 13	4		21 0	69	55	68	rain and sun
14	5		45 0	68	55	69	clouds and sun
15	6	Small	60 0	69	62	70	rain and sun
16	7	branches	90 0	69	57	75	rain
17	8	and	75 0	69	56	74	ditto
18	9	leaves.	30 0	69	53	79	rain and sun
19	10		3 0	69	57	78	ditto
			324 0				
4th Age							
Day 20	11		75 0	69	57	76	rain and sun
21	12		127 8	69	64	75	clouds and sun
22	13	Small	180 0	68	65	71	fine
23	14	branches	195 0	66	62	74	clouds and sun
24	15	and	249 0	66	65	75	sun and rain
25	16	leaves.	105 0	68	66	72	ditto
26	17		7 8	69	57	70	fine
			939 0				
5th Age							
Day 27	18		180 0	68	60	72	fine
28	19		270 0	68	62	73	rain and sun
29	20		360 0	68	57	73	ditto
30	21		465 0	66	59	75	rain
31	22	Small	540 0	68	57	73	clouds and rain
32	23	branches	675 0	68	53	72	rain and sun
33	24	and	825 0	68	55	74	ditto
34	25	leaves.	975 0	68	53	74	ditto
35	26		750 0	69	55	73	ditto
36	27		420 0	69	55	73	clouds and rain
37	28		270 0	69	50	72	rain and sun
5th Age - - - - - - - - -			5730 0				
4th Age - - - - - - - - -			939 0				
3rd Age - - - - - - - - -			324 0				
2d Age - - - - - - - - -			83 0				
1st Age - - - - - - - - -			30 0				
Sorted leaves - - - - -			7106 0				

Observations on Second Table.

First Age.—The silk-worms, on some tables or hurdles, roused sooner than others; by reason of the exterior cold, the temperature of the small laboratory was, in some parts, a degree and a half below other parts, although the whole laboratory was well closed, and lined to keep out the cold. This degree of cold was on the side of the apertures, and lower rows of tray hurdles.

Second Age.—The silk worms became torpid and roused with more regularity, and at less distant periods than in the first age.

Third Age.—All proceeded with regularity in this third age.

There were twenty-four pounds more of mulberry leaves consumed this year than in 1813.

There was less refuse picked from the leaves in 1814 than in 1813, consequently the average quantity of leaf must have been nearly the same both years.

Fourth Age.—Two days were employed in cleaning the wickers, because the silk-worms that were placed in the coolest part of the laboratory, became torpid, and roused a whole day later than the others.

Thirty pounds more of sorted leaves were consumed than in the year 1813, but in 1814 there was less refuse. The progress of the fourth age was tolerably regular.

Fifth Age.—The cold, and variableness of the weather, render these last eleven days of the season remarkable.

The silk-worms continue to prosper. But as the nights were very cold, an even temperature, equal throughout every part of the laboratory, could never be obtained. Fires were lighted in the stoves, and thick wood was burnt in the grates, to maintain the necessary temperature.

There were eighty-four pounds more of leaves consumed than in the year 1813.

The refuse of the leaves and the weight of dung were less than in 1813.

There were fewer mulberries on the branches, and even those were lighter in 1814, than in the preceding seasons. There were obtained six pounds more of cocoons. Some wicker hurdles required a little leaf on the 29th of June, the thirty eighth day of the rearing of the silk-worms, and they received that which had not been consumed the preceding day.

1626 pounds of leaves per ounce of eggs The silk-worms of five ounces of eggs having consumed 8130 pounds of leaves, produced 601 pounds 8 ounces of choice cocoons, and 4 pounds 8 ounces of offal. About 20 pounds of leaves were consumed for a pound of cocoons.

1814. *Expenses incurred, and profit.*

	Milan liv.	Sous.
Dr.		
Five ounces of silk-worm's eggs,	15	0
Fuel-wood for hatching them,	1	15
6250 lbs. of leaves, at 4 livres 13 sous and 6 decimes, the 100 lbs. or quintal,	385	0
Expense of gathering the leaves,	96	5
Shavings, large and small firewood, 15 quintals, at 1 livre 4 sous the quintal,	16	0
Fagots and broom to form the hedge for the worms to rise on, in addition to those of the preceding year, 1813,	4	10
Paper, in addition to that of preceding year,	4	0
Oil for lamps,	9	0
Fumigating bottle,	1	10
For day-labor, men and women,	109	0
Total,	642	0
Ground rent and interest of capital employed,	90	0
	732 M. liv.	
Cr.		
601 lbs. 1 oz. of cocoons were drawn from the laboratory, which sold at 52 sous per lb., and produced	1563	18
Net profit,	831	18 s.

Third Table.—REARING OF SILK-WORMS, *to the Sixth Age, from one ounce of Eggs.*

Ages.		Space occupied by the worms on the feeding frames, or hurdles.		Temperature; Fahrenheit's scale.	Quantity of leaves.		Total of leaves for each age.	*Observations.*
		Ft.	*In.*	*degs.*	*lb.*	*oz.*	*lbs.*	
First Age	1st day	9	6	75	0	14	7	Tender young leaves chopped fine; four meals progressively increased.
	2d do.				1	6		" " " the first the largest, the last the smallest.
	3d do.				3	0		" " " four meals.
	4th do.				1	6		The first meal of 9 oz. the others less if the leaves have not been eaten.
	5th do.				0	6		Tender leaves chopped fine. Worms casting their first skins.
Second Age	1st day	19		73 to 75	4	8	21	Half tender branches and half leaves, cut fine; the first meal 12 ounces, the other leaves in four meals.
	2d do.				6	12		Tender leaves, four meals; the two first less than the two last. Enlarge the spaces.
	3d do.				7	8		" " the two first the largest.
	4th do.				2	4		" " distribute as wanted. Worms casting their second skins.
Third Age	1st day	46		71 to 73	6	12	69	Half tender branches, half leaves a little chopped; second meal 1 lb. 14 oz.
	2d do.				21	8		Chopped leaves, four meals; the two first less than the two last. Enlarge the spaces.
	3d do.				22	8		" " the two first the largest.
	4th do.				12	8		" " " "
	5th do.				6	8		" " distributed as required. Third casting of their skins.
	6th do.				—	—		" " " " Worms are roused.
Fourth Age	1st day	109		68 to 71	23	4	210	9 lbs. of branches, 14 lbs. of leaves, cut coarsely; give the branches first.
	2d do.				39	0		Leaves coarsely cut, four meals; the two first the smallest. Enlarge the spaces.
	3d do.				52	8		" " three meals; the three first the least, the last 17 lbs. 4 oz.
	4th do.				59	4		Whole leaves, four meals; the three first 16 lbs. 4 oz., the last 10½ lbs.
	5th do.				29	4		Picked leaves distributed as wanted; the first meal the largest.
	6th do.				6	12		" " " Worms prepare to cast their skins.
	7th do.				—	—		Leaves as wanted. Worms are roused.
Fifth Age	1st day	239		68 to 69	42	0	1281	Half branches and half leaves. Enlarge the spaces.
	2d do.				65	10		Picked leaves, four meals; the first the smallest, 12 lbs.; the last 22 lbs.
	3d do.				93	0		" the first meal 22 lbs., the last 27 lbs. 12 oz.
	4th do.				130	0		" " 27 lbs. 12 oz., the last 37½ lbs.
	5th do.				185	8		" " 37½ lbs., the second 46 lbs. 14 oz.
	6th do.				223	0		" four meals, the last the most abundant.
	7th do.				214	0		" " the first meal the largest, the rest to lessen gradually.
	8th do.				150	0		" four or five meals, the first the largest, 46 lbs. 14 oz.
	9th do.				120	14		" distributed as wanted. Worms approach maturity.
	10h do.				56	4		" " " If not enough, give more.

PLAN OF A COCOONERY,

AND FIXTURES FOR THE SPINNING OF THE SILK-WORMS.

The 'Directions for the management of Silk-worms,' translated for and published in the last volume of the Farmers' Register, (commenced at page 464,) stopped at the period when the worms were ready to spin their cocoons. This was because it was not thought desirable to present the very troublesome and yet defective European methods of arranging the "hedges" or arcades of heath, bushes, &c. for the worms to climb and spin upon. We are now enabled, by the aid of a correspondent who has seen and observed much on this subject, to redeem the promise then made, of presenting a more simple and yet more perfect plan of fixtures, for this part of the business, heretofore the most difficult for novices to understand from description, and still more difficult to execute.

As a connecting link of the former 'Directions,' with the following communication, it is proper to say here, that after the general indications of the silk-worms being ready to climb and spin, such of them as still require more food, should have it given with care and moderation. After nearly all have mounted, there will always be some slower ones remaining, from their not having received enough food, or some other cause of injury. These should be removed to a place of greater heat, and well aired, which will hasten the maturity of all except such as may be too much injured to form cocoons.—ED. F. R.

For the Farmers' Register.

Much as has been written on silk-culture at large, I have not observed in any of the publications of the day, such a description of the fixtures of a cocoonery, according to the most approved and convenient plan, as would enable an inexperienced culturist to have one constructed. It is, indeed, a difficult subject to treat in an intelligible manner; but, with the aid of diagrams, the difficulty may possibly be overcome.

The advantages of the modern over the old fixtures, must be apparent on the slightest examination, to every person who has any experience in the rearing of silk-worms. The slow and tedious process of shifting the worms, and cleaning the shelves of litter, is now entirely superseded; and all the careful provision of brush and dried leaves, or of broom-corn and straw, is totally dispensed with. The management of the silk-worm is at present conducted with a saving of labor and a facility which were not attained in former times. It is true that the expense of putting up these fixtures is considerably greater; but the additional cost is fully compensated by the substitution of durable, in the place of perishable materials—by neatness for clumsiness—by the attainment of increased facilities in conducting the operations—in short, by a more perfect adaptation to the end to be obtained.

Having enjoyed the opportunity of inspecting a number of cocooneries during the past feeding time, and being desirous of contributing my mite to the great work which is now exciting so much interest, I submit a description of the building which appeared to me to unite the greatest number of advantages.

The building is 100 feet long by 30 feet wide, in the clear, and two stories high, besides the basement or cellar. The dimensions of a house, however, unless it is erected expressly for a cocoonery, are of secondary importance. If 30 feet wide, which is a very convenient size, there should be four ranges of shelves running lengthwise of the room. Each of these ranges, or rows of shelves, occupies a space of three feet of the width of the room, which will leave 18 feet to be divided into five aisles, or passages, each three and a half feet wide, viz.: two of the passages outside of the shelves and between them and the walls, and three between the several rows of shelves. There should also be three passages across the room, namely, one at each end, and one in the middle, opposite the doors. The annexed drawing, though not well proportioned, may convey an idea of the ground-work, or manner in which the rows of shelves and passages are laid off.

FIG. 1. *Part of the horizontal plan of the shelves, and passages.*

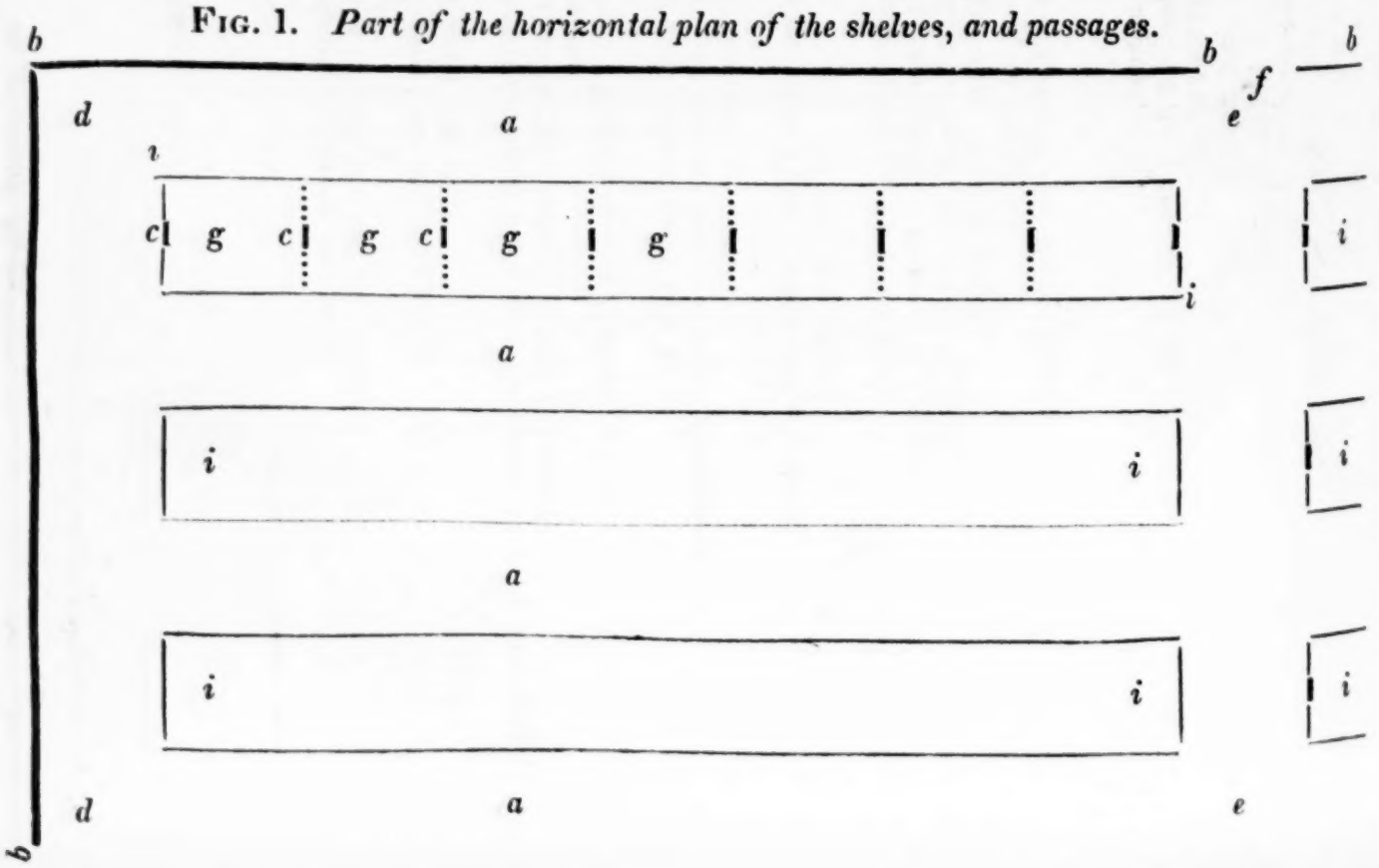


FIG. 1. *b, b, b,* Part of outer wall of cocoonery.
a, a, a, Parts of passages running lengthwise.
d d, e e, Cross passages.
f, Door.
g, g, g, &c. Hurdles.
i i, i i, &c. Ranges of shelves.
c, c, c, &c. Upright posts.

A single row of posts serves for one row of shelves. The posts *c, c, c,* are of plank 8 inches wide by 1½ inches thick; they reach from the floor to the ceiling, and are exactly 4 feet apart from the centre of one to the centre of the other. They are to be accurately ranged with each other, (in the direction of the length of the shelves,) throughout the length of the row. It is to these posts that the superstructure is attached, both for feeding the worms and accommodating them when they are ready to spin. To explain the manner in which the fixtures are put up, and to render the whole description as intelligible as possible, the reader is referred to the following drawing, fig. 2, which represents the position of the posts, and so much of one of the shelves as is included between two of the posts.

FIG. 2. *Horizontal plan, (on enlarged scale,) of the frame-work of a portion of the shelves.*

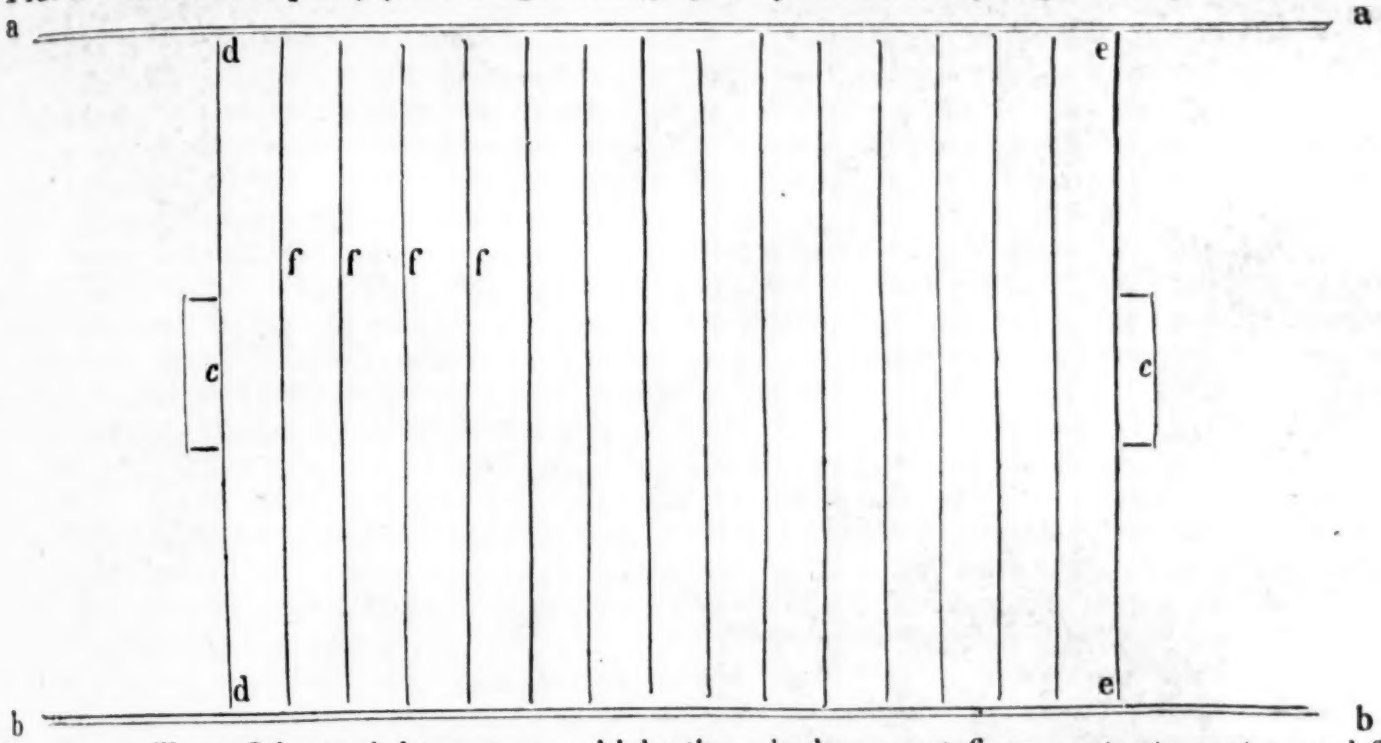


FIG. 2. *c, c,* Two of the upright posts, to which are nailed, *d d,* and *e e,* cross-laths.
a a, b b, Parts of the longitudinal laths, three-fourths of an inch across, and 2 inches deep, nailed to cross-laths *d d,* and *e e.*
f, f, f, f, &c. Other cross-laths of same sizes, nailed to *a a,* and *b b.*

The boards which form the shelves is to be nailed on this frame-work, and a hurdle to lie on the space between the posts *c, c.*

The first or lowest shelf of each of the four rows or ranges, is 14 inches from the floor of the room; and the same space is preserved between the top of the lowest shelf, and the bottom of the one immediately above it, and so on from one to another, until the proper height for the uppermost shelf is attained. It is by this arrangement that a room of moderate size may be fixed to contain a considerable number of worms. The number of tiers of shelves, in the same row, may be from four to eight, according to the height of the ceiling and other circumstances. At 14 inches then from the floor, laths or strips 2 feet 10½ inches long, and 2 inches wide by ¾ thick, (lines *d, d,*) are nailed upon the flat sides of the posts (*c, c,*) and at right angles to them. Other laths of the same length and size, are then to be nailed on the opposite sides of the posts, and the same height above the floor. The ends of these laths are connected together by pieces of similar dimensions, (*a a, b b,*) but of greater length, say 8, 12 or 16 feet long, (the posts being 4 feet apart,) running longitudinally with the room. They are nailed to the ends of the short laths. The spaces between the posts (*c, c,*) are to be supplied with other cross strips (*f, f, f, &c.*) of the same size and length of *d d,* three inches apart from centre to centre, and fastened at the ends to the pieces *a a, b b.* The frame-work here attempted to be described, and on which the floors or shelves are to be laid, may be illustrated by comparing it to the sills and sleepers of a house, before the floor is put down. The only difference in the two cases is, that in a house, the planks of the floor are laid *across* the sleepers. In the present case the planks of the shelf are placed in the same direction *with* the sleepers *(f, f, f, &c.)* As the shelves are three feet wide, the planks therefore must be sawed up in lengths of three feet. They should be of very thin boards; half inch, or five-eighths at most, in thickness. It is proper to have them tongued and grooved, in order to prevent the litter from falling through, and interfering with the worms on the shelf below. The floor is fastened down by first nailing the ends of the planks to the laths *a a, b b;* and afterwards by driving one or two nails through the floor into each of the cross laths or sleepers, *d, e, f.* The floor is to be fitted round the posts, so as to present an unbroken surface; and, in order to facilitate the workman in this part of the business, it would be best to procure boards of regular width, so that a specified number, 4, 6 or 8, would, when dressed and jointed, reach from the centre of one post to the centre of the next.

The worms are fed on hurdles placed on the shelves—one hurdle on every shelf, and between every two posts. Hurdles of network are now in general use at the north, though there still exists a prejudice against them in the minds of some silk-growers. In extensive cocooneries, however, it is difficult to conceive how they can be dispensed with. Their size should be made to correspond

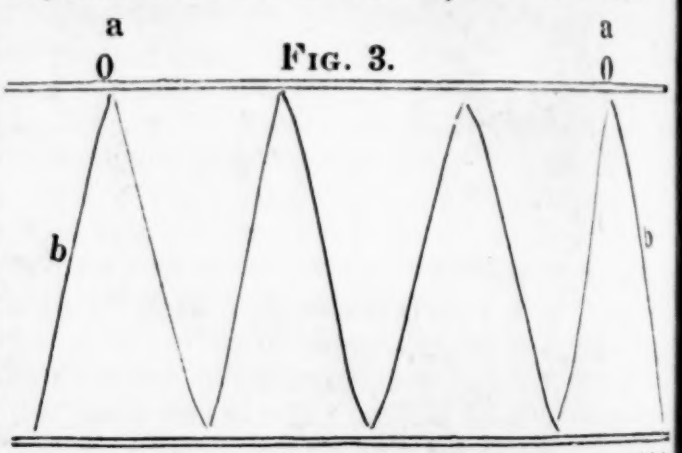
to the width of the shelf, and the distance between the posts; say 3 feet by 3 feet 10¼ inches, which will allow a quarter of an inch play between the posts. The vacant spaces between the hurdles and opposite to the posts, should be closed by strips of a suitable size when the worms are ready to spin; otherwise, some of them will form their cocoons in these vacancies. The frames of the hurdles are made of laths 2 inches by ⅝ths. The most expeditious, as well as the strongest, way of putting them together, is to lay the laths *flat* in a mitre box; and saw off the pieces into proper lengths. Then with a brace-bit, bore a hole (in horizontal direction,) at each corner of the frame, and fasten together with pins. It is best that the hole should be bored as near to the inner angle of the corner, as the length of the bit will allow; and it would add still more to the strength of the frame, to dip the pins in glue, and even to glue the joints. The network, which is made of well twisted, smooth cotton twine, is first tied to each corner of the frame, and then stretched by means of a string passed through the outer row of meshes, and drawn over tacks or small nails driven on the upper side and near the inner margin of the laths, at distances of three or four inches from each other. The meshes are about an inch square, tied together at the corners like a seine. This net is obtained at the north at a very moderate cost, not exceeding 8½ cents the square yard. There is an inferior article which is *woven*, that costs about 6 cents. Either of them, however, could readily be prepared in most families.

The changing of the worms renders it necessary that the number of hurdles should be greater than merely sufficient to occupy the shelves at any one time. Perhaps half as many more would constitute a full supply. In feeding, the hurdle lies on the shelf with that side underneath, and in contact with the shelf, to which the network is attached. When the operation of shifting the worms and carrying off the litter is to be effected, a fresh hurdle is placed in the same position, immediately over the one which contains the worms, and resting upon it. Cut leaves are then to be sprinkled over it; and in a short time, a few hours at most, worms will have crawled upon the upper hurdle, when the lower one is to be withdrawn and emptied of its contents. By this process, great numbers of worms are changed in the course of a day, without any necessity for handling or even touching them.

But the chief merit of a cocoonery, such as I have attempted to describe, consists in the accommodations which are afforded to the worms for spinning. Immediately over the worms, at the bottom of the shelf above, amongst the sills and sleepers (so to say,) on which the floors of the shelves are laid, they find a place adapted to all their wants. In the recesses formed by the junction of the laths with the planks of the shelves, I have seen thousands of cocoons beautifully and regularly arranged. According to this plan, it will be necessary to have an extra shelf fitted up in the same manner, above the highest one on which the worms are reared. The advantages of this fixture for spinning, are several. It offers to the worms a quiet and secluded situation, at a time when they should not be subjected to interruption; while such as are backward in mounting, may be attended to, and supplied with food as ususal. The cocoons are gathered with much greater facility. Instead of the old mode of picking them, one by one, out of brush and dried leaves, and separating them from the litter, a handful may be collected at once, without a particle of litter upon them. The situation, moreover, appears to be gratifying to them. They do not leave it in such large numbers as they frequently do other accommodations, to wander over the ceiling, or amongst the rafters of the building, before they can find a resting place.

To enable the worms to ascend more readily, ladders of very simple construction are prepared. Take two very small laths, about half an inch square, and 3 feet long—lay them down on a work bench, at distances from each other equivalent to the spaces between the shelves, (say 13 or 14 inches,) and connect them together by a twine cord, fastened to tacks driven in the laths every three or four inches. The tacks on the upper lath are not perpendicularly over those in the lower, but over the middle of the intermediate space; by which, the twine is inclined, as in the zigzag lines *(b b, &c.)* of fig. 3. When the worms are ready to climb, the ladders are suspended over each end of every hurdle, near the posts, by loops *a a*, attached to one of the strips of the ladder.

FIG. 3.



Another fixture for saving labor, is a car which runs up and down the passages—to be filled with leaves when the worms are fed, and to receive the litter when they are cleaned. It is made low enough to pass under the lowest shelves, and the wheels are kept in place by means of strips nailed down to the floor of the room, like the rails on a rail-road. It serves very much to facilitate the progress of operations in a cocoonery where labor is not abundant; and indeed, under any circumstances, it is a great convenience.

The materials for fitting up a cocoonery should be of the lighest wood, either poplar or any species of pine; and though not absolutely necessary, it would contribute greatly to the neat appearance of the whole work, if all the pieces were dressed, however slightly, with a plane.

It may be thought that the plan of having double rows of shelves, as in Count Dandolo's cocoonery, and indeed in many in this country built after the model of his, would possess advantages over the one now described. The wide passages which would thereby be gained, would certainly be a great acquisition; but it is at least questionable whether the inconvenience of having to reach over shelves six feet wide, would be at all compensated by this advantage. But to say nothing of feeding, the fixtures for spinning, though they might be fitted up in one case as well as in the other, would scarcely be available when the time arrived for gathering the cocoons. The wide shelves however, are now generally disapproved.

They are heavy and clumsy in appearance, and inconvenient in practice.

The spaces that silk worms require, do not seem to be very accurately defined. Of American writers, (who all follow the European authorities,) some speak of square feet, others of feet square; and others again simply mention the quantity of feet, without stating whether it is linear or superficial measure. Each hurdle, however, of the dimensions previously described, may accommodate a thousand worms during their last age; and from this datum, an estimate may be formed of the number that a room of any prescribed size will contain. A room for instace, 100 feet long and 30 feet wide, with four rows of shelves, and five shelves to a row—allowing for a cross passage in the middle and one at each end—will contain 440 shelves, and accommodate 440,000 worms. For every additional tier of shelves, which however could not conveniently exceed three more, the number might be increased 88,000, or amount in the aggregate to nearly 700,000. But foreign writers allow a still greater number to a house of these demensions. The laboratory of Count Dandolo, in which he reared the worms from twenty ounces of eggs, equal to more than 700,000, was 77 feet long, 30 feet wide, and 12 feet high. The number of shelves it contained is not specified. Experience alone can determine this point to general satisfaction; and until it is settled, silk-growers should rather err on the safe side, by allowing abundant space to their worms.

Although the most approved plan for constructing a cocoonery, has been attempted to be detailed, including the most convenient size for the building, yet fixtures of a much more clumsy description will answer very well on a diminished scale; and almost any house, even a barn or tobacco house, will serve for a cocoonery, provided a sufficient circulation and ventilation can be effected. But when the business is entered into extensively and systematically, the silk-grower will doubtless find it to his interest to build houses expressly for the purpose, and have them fitted up with a view to the greatest economy of time and labor, as well as to durability. "Whatever is well done, is twice done," says the old adage. But costly cocooneries, and convenient fixtures, alone, will not command success. The race is not always to the swift, nor the battle to the strong. Those who devote the most unremitted attention, by night as well as by day, in season and out of season, will be most likely to succeed.

T. S. Pleasants.

DAIRY STOCK.

From the Second Report of the Agriculture of Massachusetts.

The farmers are unanimous in their preference of the common native stock of the country, in which the Devon blood predominates, to any foreign stock with which they are acquainted. They are in general as decided in their preference of small, over large-sized cows. They are not, however, raisers of stock; and buy their cows wherever they can find them, according to their best judgment. The remarkable produce, if so it be considered, is to be attributed to extraordinary good management and keeping; and on this account, deserves the more attention, as showing what may be done.

The dairy stock in England which seems to have the preference over all others, is the Ayrshire. The origin of this stock is not well ascertained; but though it has some of the qualities of the improved Durham, it is a race distinct from that. Great pains have been taken and great expenses incurred, in order to introduce this fine Ayrshire race of cows into our state, by the Massachusetts Agricultural Society, and by an intelligent and public-spirited friend to agricultural improvement in Watertown. I regret that I am not able to obtain such returns as would enable me to speak confidently of the merits or defects of this stock, so far as these cases go; but I am safe in saying, that some slight disappointment has been experienced. It is probable, from the celebrity which they had obtained abroad, too much was expected from them here. Extravagant statements have been made respecting their produce in Scotland. One of the advocates for this stock, and a man upon whose authority great reliance is placed, has undertaken to calculate precisely the number of quarts of milk given, and the number of pounds of cheese made, from what is stated to be in money the average produce of an Ayrshire cow. This is certainly rather a loose way of reaching the result. Entire reliance cannot be placed upon it. This, another distinguished Scotch farmer and dairyman admits; and says that "those statements are far too high and not well founded."

He refers to a farmer, on whose exactness he entirely relies, whom he pronounces a man of superior intelligence and accuracy, and who has devoted himself to dairy husbandry, and, farther, whose stock were particularly select, and "who had every inducement to keep them in the highest condition requisite for giving the largest product in milk." The farmer referred to, states, that at the best of the season the average milk from each cow is nine Scots pints (4½ gallons,) and in a year, 1300 Scots pints or 650 gallons. A Scots pint is two quarts. Now, allowing these cows to be in milk 320 days, the average yield of a cow would be 8⅛ of a quart per day. But if we understand this to be wine measure, which is the usual standard of measurement in England, and compare it with our customary admeasurement of milk in Massachusetts, which is always beer measure, we must deduct one fifth; and then the average product of an Ayrshire cow, compared with ours, is 6½ qts. per day for 320 days. Such a yield is often surpassed by cows of our native stock. I have before me the case of a cow of native stock among us, who. in 268 days, yielded 2923 beer qts. of milk; and of another, that produced 3975 beer qts. of milk in ten months. I can produce, within my own knowledge, a list of nearly fifty cows of native stock, almost as productive as these. I do not mean to undervalue the imported stock. Far from it. I deem the introduction of the Ayrshire stock and the improved Durham short-horn, a great benefaction to the country. Their tendency to fatten, their early maturity, their beautiful proportions, highly commend them to our good will and our interests. As yet, we have not had, by any means, a sufficiently fair trial of their dairy properties so as to determine fully, either for or against them; and it has

been found here, in repeated instances, as it has proved abroad, that a cow, from a cross of an improved Durham with the Devon, has given a valuable animal for the dairy. But among the great advantages which is to result from the introduction of this improved and beautiful stock, is this: to give our farmers a knowledge of what can be done by skill, intelligence, care, selection, and perseverance in the art of breeding animals for any purpose; in obviating defects of form, constitution, and habit; and in perpetuating and transmitting excellent and desirable properties. In the Ayrshire stock, and in the improved shorthorns, the most shrewd and persevering efforts have been exerted, and the highest practical skill and philosophy have been taxed to carry this race to as great a degree of perfection as any thing of the kind can be; and the success has been decisive and wonderful. Excepting in one instance, to which I shall hereafter refer at large, perhaps there cannot be found in the whole of New England, a single instance of any enlightened, determined, and systematic attempt to form a race of animals of particular and desirable properties. It is most important that this should be attempted in different parts of our country, with what are called our native stock, who have become, in various ways, so crossed and mixed up, that there is in truth no particular race among them. A large portion of them are as ungainly, unthrifty, and unproductive as can well be represented or imagined. Yet there are among them so many extraordinary animals—extraordinary for their produce in milk, butter and cheese—that a few years of careful and intelligent selection from the materials already to our hand, and a strict observance of those philosophical principles of breeding which are well ascertained and understood, would undoubtedly give us a breed of animals, a stock or race of animals, greatly superior to that which now exists among us. This has been attempted in one instance by a highly intelligent breeder among us; and he is now able to show three generations of animals of as extraordinary character for the creamy or butyraceous quality of their milk, as has ever been known; two quarts of what is called the strippings, the last part drawn off of the milk of one of these cows, having repeatedly produced one pound of butter; and the cream, as it came from the pans, as I have seen myself, becoming by churning converted into butter of the finest description in less than one minute by the watch; and this process repeated at pleasure.

Let us now compare the amonnt of cheese made by the English dairies, with some in this county of which I have here given an account.

An Ayrshire cow, it is said by the English authorities, will yield 257 lbs. butter per annum, or about 5 lbs. per week, all the year round, besides raising the calf; or of new milk cheese, about 514 lbs. There returns are certainly large; but they rest upon a calculation of the quantity of milk, which the cow is supposed to yield, rather than upon any account of an actual yield. None at least is given. This, therefore, is not so satisfactory as it would be, if it were a precisely ascertained result. One of the best authorities says, that in England, "a well-fed cow of a good breed will produce, upon an average, 180 lbs. of butter in the season. The common calculation is, indeed, 150 lbs.; but this is made upon mixed stock, which affords no certain data. In the Epping district, where there is an indiscriminate mixture of Devon, Suffolk, Leicester, Holderness, and Scotch, the calculation, in a well-managed dairy, amounts to 212 lbs.; that is, 6 lbs. per week during 26 weeks, and 4 lbs. per week, during 14 weeks. The average product of cheese in the best dairies, where the whole milk and cream are used, cannot be estimated at more than 4 cwt.—that is, 448 lbs. On deep grazing soils, that carry a heavy stock, a well-managed cow is reckoned to make from three hundred and sixty pounds to six hundred pounds. In Somersetshire, the average is 4½ cwt., or 540 lbs.; in Essex not so high, and in the midland counties something more than 3 cwt." It will be seen, in looking back upon the dairy returns in some parts of this county, that they are inferior to these, not frequently passing beyond 250 or 300 lbs. of new milk cheese. On the other hand, the returns of some of the dairies in Cheshire show an actual amount of annual produce of more than 500 lbs. to a cow, and in some cases 627 and 632 lbs. It may be said, that this is owing to the fine pasturage which is to be found in Cheshire and its vicinity; to the particular care which is taken of the cows; and the system of high feeding adopted. But it shows conclusively that the cows are capable of being brought to this productive yield; and the feed and management are matters which can be adopted any where.

REMARKABLE DAIRY PRODUCTS. A MASSACHUSETTS FARMER.

From the same.

This farmer has now a dairy of 24 cows; and they produce a cheese per day, weighing about 100 lbs. Supposing that it requires a gallon of milk to produce one pound of cheese, this would give 400 quarts of milk per day, or at the rate of 16⅔ of a quart to a cow. These cows are all of native stock; most of them raised by himself. His average product of new milk cheese to a cow in a season, is between 500 and 600 lbs. Last year the actual yield was 598 lbs. to a cow. Of his 24 cows last year, two were heifers of two years old, just come in. Four years since he was the owner of a cow, whose milk in the best season amounted by actual weight to 70 lbs. per day. During the time of her greatest yield, she was fed with four pails of cheese whey, and some rye meal. She was of native stock. This farmer has a heifer from her, which gives, as he supposes, 60 lbs. of milk per day. He gives an opinion, which, from his successful experience, certainly deserves attention; that heifers which "come in" with their first calf at two years old, do better than when their coming in is delayed until three years old. Their milking properties are in this way improved. Probably he is right in this matter; but the general experience of the best farmers recommends that, if a heifer comes in at two years old, she should not be allowed to have another calf, under at least eighteen months from this time.

The establishment of this farmer is substantial and independent. As far as the common comforts of life are concerned, little more seems to be desired. Good air, good water, plenty of bread, plenty of fuel, plain and substantial clothing made

by the hands of his own family, and the product in a great measure of their own flocks and fields; an estate which he can call his own with truth, because it has been purchased not by fraudulent speculation upon other people's earnings, but by the healthful toil of his own muscles and the sweat of his own brow; luxuriant pastures filled with those beneficent animals, who are nourished by his kindness, and settle their bills in the most honorable manner every night and morning; and a clean dairy room of ample dimensions and exemplary neatness, with its numerous shelves, loaded with the richest produce, and speaking as well for the in-door as the out-door management; these features combined in this picture, present one of those beautiful examples of rural independence, and the bountiful rewards, with which a kind providence is pleased to crown industry, frugality, and good management, with which I am happy to say the county of Berkshire is every where sprinkled over, even on its high mountain summits, as well as on its fertile alluvions, and in its peaceful and secluded valleys. The independent proprietor of this establishment is now sixty-six years old. At the age of nineteen he was not the owner of a dollar. He now admits himself worth thirty thousand dollars; and all this, with the exception of less than fifteen hundred dollars, is the produce of his own farming industry, as he has never been engaged in any speculation whatever. A higher good than all this is found, in the fact, which he added with an honest pride and an enviable pleasure, that he had brought up eight children in habits of honest industry; and not one of them had ever disgraced his parents.

The standard of dollars and cents is a very imperfect standard by which to measure the prosperity of such a man. It is a prosperity which money cannot purchase, and money cannot measure. It is a prosperity flowing from deeper, purer, and more enduring sources; from a competency for the evening of life, earned by honest labor; a mind unembarrassed by the fear of want, and the vexatious caprices of trade and speculation; and a grateful sense of the kindness of that just and beneficent providence, whose blessings have rendered his peaceful and unpretending labors successful.

FEEDING AND FATTENING SWINE. APPLES AS FOOD.

From the same.

Of the swine of Berkshire county, there is little remarkable. I met repeatedly with a breed called the Mocho breed, which are much esteemed. I have found them in different parts of the state, but I can obtain no account of their origin. The Berkshire breed from England has been introduced into the county, and will extend itself as soon as its merits are properly appreciated. It is the best hog that we have among us; and when used as a cross with some of our small boned breed, such as the Byfield or the China, or the Mocho, the progeny is highly approved. In a cross with the grass breed, so common in New York, the produce is very fine. Beautiful samples of this cross have been produced on one of the best managed farms in Massachusetts, in Lexington, near Boston. The average size, at eleven and twelve months old, has been 300 to 350 lbs.; and with extraordinary care and feed they have been made to exceed 400 lbs. at ten months old. This early ripeness, in all animals designed for the butcher, is of great importance.

On the dairy farms, the raising of pork is extensively pursued, excepting where the whey itself is used for the cows. The expediency of using the whey for the cows, or, in preference, of keeping swine, is a vexed question among the farmers, which I have no means of determining. One hog is usually kept to four cows. A shoat, weighing seventy pounds in the spring, kept upon the slops of the dairy and pasturage, and some meal or potatoes, or both, may be expected, in the fall, to weigh 250 lbs.; and the farmers in general consider more than one hundred pounds of this produce as in justice to be credited to the four cows. This, I believe, is in most cases an under-estimate. No article can be given to swine, so conducive to thrift as milk, or the slops of the dairy.

One of the best establishments for fatting swine I found in Great Barrington. This farmer, whose whole management is excellent, fatted, the year before the last, twenty-four large hogs. The current year he has fatted twenty-five, and their average weight was 318 lbs.; total 7,950 lbs. His mode of fatting swine deserves attention. "As soon as the pastures will afford a good bite of grass, he turns them in where they can have plenty of clover and water. He is careful to salt them once a week, or oftener, if the season is wet; and changes them from one pasture to another, as he does sheep or other stock, which is of much importance through the summer. As soon as he gathers his harvest, he gives them the stubbles. When these are well gleaned, he gives them corn cut up by the ground for a few days as it is dangerous to keep them closely shut up and feed them highly in the beginning; having no exercise, it tends to produce the blind staggers. In order to remedy this, they must be put upon thin feed and have as much salt as they will eat. He commences steaming potatoes for his hogs the first of October, his ruta bagas not being then matured; he mashes them fine; puts nothing with them but the sour milk from six cows, and four quarts of salt to a box of twenty-eight bushels. This feed he continues three weeks. Afterwards, he commences steaming ruta baga, and continues this feed until the first of December, which is five weeks. He puts with the ruta baga, after being mashed fine, four quarts of salt and three bushels of oats and peas ground together, into a box containing twenty-eight bushels. On this feed they do extremely well. This feed he continues until the 25th of December; and then finishes off with meal and corn." The free use of salt is unquestionably of much advantage.

A very successful fattener of swine in another county, whose authority in this matter is decisive, is in the habit of boiling corn in a large vessel, and with the mixture putting in a few quarts of wood ashes. The proportions, I cannot exactly ascertain; but he considers its use once a day of great benefit to the health and appetite of his swine. He is careful likewise to put charcoal into their styes once a week. A finer stock of swine, or a finer display of fattening swine, I have never seen than I have seen at this farmer's place, which is certainly a conclusive test of the excellence of his management.

I have statements without number of the value of apples for feeding swine. In one case the gain upon raw apples was 11 pounds weight in 12 days; and in this case nothing excepting apples was used. The best form of using them seems to be to boil them with potatoes; and it is recommended by several farmers in this case to put the apples at the bottom of the kettle; and the potatoes become thus impregnated with their flavor. This comparatively new use and value of apples may be pronounced a great discovery of the most beneficial character. Many farmers, not accustomed to speak lightly, pronounce them of equal value as potatoes for the fatting of swine, for milch cows, and for beef cattle. I can answer for the human animal. There is no food more healthful or more nutritious, in reasonable quantities, than apples, cooked or raw. A dish of baked apples and pure milk is of all others the most delicious to the unadulterated taste; and the free use of apples and milk, in place of the miserable slops of tea and coffee, would give to the young bipeds of the family vigorous bodies and bright minds; abate a large item in domestic expenses; and prevent a taste for the two greatest and unalleviated curses with which humanity was ever visited, tobacco and rum.

THE TWIN, OR OKRA COTTON.

To the Editor of the Farmers' Register.

Columbia, March 26th, 1839.

* * * * * *

I have a new species of cotton, of which I will some day try and give you an account. I *know* too little yet to venture to give any thing for the public; but I will give you a very short account of what I do know.

A Mr. Terry, of Autauga county, Alabama, some years ago, bought some Petit Gulf seed. A single stalk was observed in a field, without limbs, and having great numbers of bolls adhering immediately to the stalk, or in clusters on very short limbs. The cotton had all been picked out except a single lock with nine seeds. From these seeds the variety has been propagated. The seed sold in 1837, at 50 cents a piece. Last fall I bought at $160, a bushel. The cotton examined by me exhibited a distinct variety. It had rarely any limbs longer than one joint, sometimes two; the bolls were two, three, and as much as seven in a cluster. I had one limb about four inches long, with seven good bolls opened on it. The stems of all of the bolls shooting from one place, at the top of the short limb. The cotton was exceedingly fine, being, I think, two to four cents a pound better; being in color and staple the finest and softest short staple I have ever seen. It opens earlier. The field I examined was planted the 20th April. A very intelligent gentleman, living in the neighborhood, told me he planted similar land on the 1st of April, and that the new cotton was open two weeks earlier than his. It grows in good land quite tall, say six or eight feet; and in this I fear, will be the greatest objection to it, as it may fall when heavily fruited towards the top; but perhaps this may be avoided by topping. Its advantage to an Alabama planter, if it succeeds in rich prairie lands, will be its early opening, by which the worm will be avoided, a terrible enemy, which has eaten up full one-third of my crops for five years. The appearance of the stalk is more like okra than any other—the leaf being a cotton leaf. If the "humbug" succeeds, I value it more than multicaulis, and will give you an account at some day. In the mean time, I remain very truly,

Yours, F. H. ELMORE.

Greene, Ala., April 11, 1839.

Though Virginia is not a cotton growing state, and you consequently cannot feel the same immediate interest in our southern staple that you do in many other productions of the soil better suited to your climate, still, from the position you occupy before the agricultural public, and the interest you naturally feel in *all* things connected with the subject of agriculture, I flatter myself, a few seeds of a variety of cotton recently brought into notice, which I take the liberty of forwarding you, will not prove unacceptable. It is styled the "twin" or "Aldridge" cotton, taking its first appellation from the peculiar manner in which the branches originate from the stalk, I think, (for I have never seen it growing;) its second from the name of the gentleman who brought it before the public. Whence or how it originated seems to be a matter of doubt. Some saying that it accidentally, as it were, sprung up in a cotton field of Mr. Aldridge, the seed of which he carefully preserved—others that it was brought from Louisiana—&c. &c. All this is conjectural, and though evincing a pardonable curiosity, has but little to do with the intrinsic advantages of the article. Yet these have not been so fairly tested as positively to be determined. Those claimed for it, however, are its being better able to stand the effects of a drought, not casting the squares, however severe this may be; and from the extreme shortness of its branches, it will bear much closer planting; which, connected with the fruitfulness of each individual plant, render it a much more prolific variety than others. It is not contended that the staple is of a very superior quality. 'Tis said to grow with great rapidity. From its recent origin, small beginning, and the price of the seed, *fifty cents a piece, only*, its cultivation has been quite limited; and further experience is required to decide its fate. Whether it will eventually prove that it has been brought into notice, as the price would seem to indicate, for purposes of speculation, like many other articles, will ere long be determined. Yet, it is a singular variety, and I wish I could send you more of the seed, that you might give it a more extended test in Virginia; but I spare you more than half of a small parcel which a friend has just given me. There is no peculiarity attending its cultivation; and your climate no doubt is sufficiently favorable to promise success to your experiment—or, if it fail, it will be so limited as not to create any very *serious shock*.

The two foregoing extracts from private letters, seem to refer to the same new variety of cotton; and as each correspondent enclosed a few of the seeds, we shall be enabled to rear and compare the plants. Deeming the information as not only curious and interesting, but as promising much value to the agricultural interests of the south, we wrote immediately to ask leave of the first correspondent

to publish his *preliminary* statement, in advance of the more full future information he had promised. This he kindly accorded, and therefore we are authorized to give, what is always so desirable, the writer's signature to his statement. Time did not permit a like application to the other and more remote correspondent; or leave would also have been asked of him to publish what he designed to be private; and, therefore, in *taking* the liberty, the name of the correspondent is withheld. The high authority which we attach to the opinions of both these gentlemen, offers to us a much better assurance of the superior value of this new kind of cottton, than the enormous price of its seed. Still, it would seem, there is no mode so effectual to introduce a new thing, whether it be of the most valuable kind, or the most palpable humbug and cheat, as to ask for it a price of the most unheard of enormity. If, according to the heretofore liberal and universal procedure of southern agriculturists, the first holders of this variety of cotton, had offered to *give away* seeds, or to sell them at merely a fully remunerating price, few persons would have cared to plant them. But by pursuing the contrary course, and asking 50 cents a seed, the anxiety to obtain them has probably been increased in the ratio of the advance of price. All this is well, if confined to real improvements; and if such cannot be introduced by operating by means of reason and sound precept, it is certainly desirable that it should be done by operating on the credulity and folly of the recipients. But, unfortunately, it has come to be considered that the high price asked for new seeds, &c., is *alone* sufficient evidence of their intrinsic value; and hence dupes are continually made by the vilest and grossest impositions that can be imagined. Thus Grant Thorburn's "Chinese corn," at 25 cents, and latterly $1 the ear, has been sold as readily as if its alleged superior qualities were supported by the most indisputable evidence, instead of by none whatever, except the price.

But let us not quarrel with the workings of folly, if they lead to wise and profitable results; and we may bear even that dupes should be made, (as they *prefer* this mode of instruction,) by the sellers of Chinese corn and multicaulis seed, in consideration that the same kind of folly will introduce and establish the culture of the Rohan potato, (recently selling at 25 cents the pound,) the okra cotton, (if it should be what it is supposed,) the morus multicaulis, and, what will be of incalculable value and importance to the country, the great industry of silk-culture. For our countrymen closed their ears to all arguments in favor of their entering upon this culture, until the plants to feed on rose to three cents the bud; and now, thousands are about to feed worms, induced at first solely by the high price of the morus multicaulis; and we entertain no doubt but that this most valuable culture will now be speedily and surely established.—Ed. F. R.

LOIN DISTEMPER IN HOGS.

To the Editor of the Farmers' Register.

March 30*th*, 1839.

In the November number of the Farmers' Register for 1838, I find a piece from the Tennessee Farmer, signed Parvus Agricola, entitled "loin distemper in hogs;" by which I suppose is meant the dragging of the loins and hind legs—not an uncommon disease with hogs. Why Agricola happened to stumble upon arsenic as a remedy for the above disease, I am at loss to conceive; unless indeed it was to rid the poor animal of his misery, and himself of further trouble, by his speedy death, which I suppose would have been the case, had it have acted on the hog as on most other animals; but with them it is said to be innoxious, and although harmless, as it proved to be, it certainly did no good. Now his other remedy "of pouring hot tar over the loins of the hog," has some reason with it, and to which probably he is indebted for the cure.

It is to guard the inexperienced against the indiscriminate use of so deadly a medicine as arsenic, and to suggest a very simple, as well as efficient mode of treatment for the said disease, which I have been long in the habit of pursuing, that I have been induced to notice the remarks of Parvus Agricola. My method of cure though, for ought I know, may be in common use, as it is very easily practised, and one that I should think would suggest itself to almost every observing man. But as we in Virginia, are in the habit of committing most of the minor details of our agricultural labors to others, the disease as well as the remedy, may have escaped the attention of the more reflecting, and of those most interested.

The dragging of the loins in hogs is occasioned, as I suppose, for I never dissected one, by a disease of the kidneys, which may or may not be occasioned by worms, as they are frequently found in that part of the animal; and the mode of treatment that I should think would most naturally suggest itself, would be to produce counter irritation on the surface, nearest the part affected. With this view, I make a small incision on each side of the spine, through the skin, just over the kidneys, and introduce into each incision one or two peas, beans, or grains of corn, as may be most convenient at the time, previously rolled in tar, and close the skin over them, thereby producing an issue over each kidney. The result has been, that in a few days the hog was restored to its legs again, and in a short time to its perfect health. This practice I have followed for some years, and in no instance have I seen it fail to produce a radical cure. An issue made in any other way would doubtless be equally efficacious. The above mode was adopted as the most simple that presented itself to my mind.

It was in this way, I presume, by pouring the hot tar over the loins of his hog, that Parvus Agricola effected a cure, and not by the use of arse-

nic; and conceiving mine to be the most simple and efficient remedy of the two, I have ventured to recommend it.

Should these desultory remarks be the means of prolonging the life of any good grunter, my object will have been attained; as, however grovelling an animal the hog may be in its nature, it it nevertheless one of the indispensibles of low-land Virginia husbandry; as a well stored smoke-house, and the contents freely used, makes honest and good negroes, to say nothing of other benefits and comforts derived. A LOWLANDER.

PRICE OF MORUS MULTICAULIS SEED.

The 'Journal of Commerce,' of New York, gives the following as a remarkable example of high prices, and of the disposition of the public to pay them. But the intelligent editors of that paper did not mention, and probably were not aware of the most important item in the account, which makes the prices and the *dupery* both *transcendent*. This is, first, that neither these, nor any of the many pounds of seeds sold in this country as of the *morus multicaulis*, were grown on that variety of mulberry; and secondly, that even if they had been so grown, that the seeds would rarely, if ever, produce the same kinds as the parent tree.

"*Good Profits.*—A person last year received a small invoice of the morus multicaulis seed from Canton, which cost then about four dollars per pound. It was afterwards re-sold several times, at a constantly increased price, and a small parcel is said to have been sold at one hundred dollors the pound. The price has since abated a little, and the present market rate may be quoted at about eighty dollars the pound."

EFFECTS OF EMANCIPATION OF SLAVES IN JAMAICA.

From the Kingston (Jam.) Despatch.

We are getting on here terrible bad. The behavior of the negroes is enough to drive one out of his senses. The few that do turn out, do about one fourth of a day's work, and that for the most exorbitant wages—viz: 2*s*. 1*d*. for cutting canes in the fields; 2*s*. 6*d*. for wainmen; 3*s*. 4*d*. for cane carriers; 3*s*. 4*d*. for mill feeders; 2*s*. 11*d*. for green trash carriers; 2*s*. 6*d*. for dry trash carriers; 3*s*. 4*d*. for boilermen, and 3*s*. 4*d*. for stokermen. Some of the cane pieces not cleaned since last crop, and for crop of 1840, no prospects whatever. A few acres of cane-holes dug, but no body will plant; and even the late plants of the present crop (1839) have some of them not been cleaned since they were planted; consequently one half is dead, and the other so stunted from neglect, that they will not be worth the cutting; for instead of two hogsheads to the acre (which they ought to have given had they been attended to,) they will not, I suppose, give more than a barrel. It looks as if it was the intention of the negroes to take as much of this crop off as will suit their purposes, and let the rest rot, and make no preparations for any future one. When I say suit their purposes, I mean just to work as much as will supply them with what money they may require. Some of my principal hands are so busy planting pams in *their* grounds this week, that they have had not time to bestow a thought on the poor proprietor's produce.

"An estate in our neighborhood has struck work for two or three days past, and left about 40 loads of canes rotting in the mill yard, merely because rent had been demanded.

CARROTS.

From the Second Report of the Agriculture of Massachusetts.

Jeremiah Valet, late of Stockbridge, but now an emigrant to the fertile west, a true philosopher in a homely garb, a pure diamond, though never in the hands of the lapidary, (I would not say this if he were not out of the reach of my voice,) was much in the habit of raising carrots; and gave a preference to them over every other vegetable for fattening swine and cattle. This was the result of repeated trials and long experience. To fatting swine he gives them boiled; to store hogs, raw. His crops average 800 bushels to the acre.

Jno. Merrill of South Lee, has been a very successful cultivator of carrots. He states the yield on two acres at 600 bushels to the acre; and the cost of cultivation, exclusive of manure and rent of land, at 25 dollars per acre; or a little more than four cents per bushel. For feeding horses, he says, he should prefer one hundred bushels of carrots and one hundred bushels of oats to two hundred bushels of oats. He applied them in a raw state to the feeding of his team horses, and horses in preparation for market; and they were kept by them in high health and spirits. Oats followed his carrot crop on the same ground with great success. The experience of J. C. Curwen, Eng. in the use of carrots for horses, corresponds with that of Mr. Merrill. The authority of Curwen is unquestionable; and he was in the habit of employing constantly as many as eighty horses on his farm and in his extensive coal-mines.

"I cannot omit" he says, "stating the great profit of carrots. I have found by the experience of the last two years, that where eight pounds of oat-feeding was allowed to draft horses, four pounds might be taken away and supplied by an equal weight of carrots; and the health, spirit, and ability of the horses to do their work be perfectly as good as with the whole quantity of oats. With the drill husbandry and proper attention, very good crops of carrots may be obtained upon soils, not generally supposed suitable to their growth."

He adds in another place. "The profits and advantages of carrots are in my opinion greater than any other crop. This admirable root has, upon repeated and very extensive trials for the last three years, been found to answer most perfectly as a part substitute for oats. Where ten pounds of oats are given per day, four pounds may be taken away; and their place supplied by five pounds of carrots. This has been practised in the feeding of eighty horses for the last three years, with the most complete success, and the health and condition of the horses allowed to be improved

by the exchange. An acre of carrots supplies an equal quantity of food for working horses, as sixteen to twenty acres of oats."*

My own experience of the value of carrots, which has not been small, fully confirms these statements. I have obtained at the rate of more than a thousand bushels to the acre on three-quarters of an acre; but on several acres my crop has usually averaged 600 bushels to the acre.

——Smith of Middlefield, Hampshire county, from three-fourths of an acre obtained 900 bushels.

Charles Knowlton of Ashfield, Franklin county, this year obtained 90 bushels on twelve rods of ground. This was at the rate of 1200 bushels to the acre.

D. Moore of Concord, Middlesex county, from six rods of land, obtained this year 56 bushels, or at the rate of 1493 bushels to the acre.

According to Josiah Quincy's experience in Quincy, Plymouth co. charging labor at one dollar per day, his carrots cost him eleven cents per bushel. David and Stephen Little, in Newbury, Essex county, in 1813, obtained 961 bushels to the acre, at an expense of $79 50 every expense included, excepting rent of land. This was at a rate less than nine cents to a bushel.

The great objection to the cultivation of carrots lies in the difficulty of keeping them while growing free from weeds. If sowed without any preparation, the seed is a long time in germinating; and a plentiful crop of weeds is liable to get possession of the land before the carrots make their appearance. There is another difficulty. The carrot seed, from its minuteness, is liable to be sowed too thickly. To obviate in a degree these objections, let the ground be ploughed deeply, well manured, and put in fine tilth; and let the first and perhaps the second crop of weeds be ploughed in. After this, let the land be thrown into ridges two feet apart, and the seed sown on top of the ridges either in a single line, or the ridges be made so wide as to receive two rows of carrots, eight inches or one foot apart. In the mean time the seed should be freely mixed with fine sand; and the sand kept so moist that the seed shall germinate. As soon as it is sprouted it should be sown. This may be so arranged that the sowing shall take place about the first of June. They will then have the start of the weeds. The mixture with sand will prevent their being sown too thickly. After the first thinning and weeding is over, if done with care, the battle may be considered as won. Afterwards let them be cultivated with a plough or cultivator and kept clean. When the time of digging arrives, the work will be greatly facilitated by passing a plough directly along the side of the carrots; and they are easily thrown out by the hand.

For the Farmers' Register.

MONTHLY COMMERCIAL REPORT.

The apprehensions of political disturbances, which lately existed, are happily dissipated, and the recent accounts from Europe, per steamer Great Western, show a favorable state of markets there for tobacco and cotton, but not for grain and flour. Prices with us are influenced accordingly. In tobacco there is some advance, but the range of quotations is still $6 to 16, and occasionally higher for very choice quality. The quantity brought in for inspection is increasing as usual at this period of the season.

Considerable sales of cotton have been recently made at 13½ to 14½ cents, and some choice quality at 14¾ to 15. The crop of the United States, it is now confidently believed, will fall short of 1,500,000 bales. Prices in this country are higher than the last quotations from Europe warrant; shippers therefore must calculate on a further advance there.

Large sales of flour were made in Richmond some ten days ago, at $6 75; but this price cannot now be obtained, and the quotation is $6 56 to 6 62. Even at this decline in price it is not probable that shipments will be made to England, from an apprehension that the duty there will advance.

Wheat commands $1 40 cents; corn 80 to 85 cents. Exchange on England 8½ X.

April 26, 1839.

☞ Subscribers are respectfully requested to read the conditions of publication, at the latter part of this number; and all of them who have not already done so, are again invited, and requested, to make use of the privilege offered to them in the second and third articles.

CONDITIONS OF THE FARMERS' REGISTER.

For Vol. VII. Prices still more reduced, for punctual or advanced payments.

I. The Farmers' Register is published in monthly numbers, of 64 large octavo pages each, and neatly covered, at $5 a year, payable in advance. Or, for $5 may be had *two copies* of the same current or forthcoming volume, for *new subscribers*, if so ordered and paid for in advance, (or at the time of making the subscription,) in current money, (as described below,) and without loss or deduction for postage, or any other charge to the publisher.

II. Subscribers now on the list, who have already paid the regular subscription price of $5 in the manner above required, for a single copy, shall have the privilege, upon sending a *post-paid* order, of having a second copy of the same volume sent to any NEW subscriber, without further charge, for that volume.

III. A like privilege will be allowed to every old subscriber who has not yet paid, but who shall do so, as above, before the issue of the 12th number of the 7th volume; thus in effect REDUCING TO HALF PRICE THE COST OF THE WORK TO EVERY SUBSCRIBER, OLD OR NEW, WHO MAY CHOOSE TO AVAIL OF THE OFFER.

IV. If, however, no more than one copy is ordered, the subscription price will still be, as heretofore, $5 the volume; as it is not designed to permit any subscription debt, or payment, to be made for less than $5. And if an order is sent for two copies, without compliance with the conditions annexed, only one will be sent.

V. The price of back volumes, as heretofore, is $5 for one alone, $10 for any three together, and in the same proportion ($3.34 cents for each,)

for any number of volumes; except that vol. I., is to be furnished only as part of a full set.

VI. ALL MAIL PAYMENTS MUST BE MADE IN NOTES, OR CHECKS, OF PAR VALUE IN VIRGINIA, or of a CITY and SPECIE-PAYING bank of the state in which the subscriber resides.

VII. The risk of loss of payments for subscriptions, sent free of postage, which have been properly committed to the mail, or to the hands of a postmaster, is assumed by the editor.

VIII. All letters to the editor in regard to the Farmers' Register must be post-paid—except such as contain articles for publication.

IX. If a subscription is not directed to be discontinued before the first number of the next volume has been published, it will be taken as a continuance for another year. Subscriptions must commence with the beginning of some one volume, and will not be taken for less than a year's publication.

X. The mutual obligations of the publisher and subscriber, for the year, are fully incurred as soon as the first number of the volume is issued; and after that time, no discontinuance of a subscription will be permitted. Nor will a subscription be discontinued for any earlier notice, while any thing thereon remains due, unless at the option of the editor, (or in obedience to the regulations of the Editorial Convention, copied below.)

XI. For all copies not received by mail, at the proper post offices, duplicates will be furnished to those subscribers *who have complied with their own obligations;* provided that the failure *shall be notified through the postmaster*, and *within two months after the date of the miscarried copy.*

Petersburg, Va., Jan. 1st, 1839.

General Regulations adopted by the Editorial Convention.

The following resolutions of the Editorial Convention of Virginia, will hereafter form part of the Conditions of the Farmers' Register, and will be strictly observed.

1. "All subscriptions shall hereafter be considered as incurred and due in advance, and for a year's publication, unless specially ordered for a shorter time, and paid for in advance for that shorter time, when so ordered.

2. "No publication shall be sent to the order of any new and unknown subscriber, unless paid for in advance, or satisfactory reference be made to some known and accessible person in regard to the subscriber or his payment. But, in case of an order for a publication, without payment, from a new subscriber who is unacquainted with the conditions, a single number may be sent, containing, or accompanied by, a copy of this regulation.

3. "The names of all subscribers, whose ability to pay may be unknown to the publisher, and who may remain indebted on open account at the end of two years, from the time when the advanced payment was due, shall be erased from the list of subscribers."

[*Resolutions of the Editorial Convention of Va.*

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ERRATUM.—Page 237, line 9, for "*manure*" read "*measure.*"